CHNOLOGY DEPT.

JANUARY
1934

First Copy

FLEET OWNER

THE FERGUSON PUBLISHING CO., 50 WEST ST., NEW YORK, N.Y.

Devoted to the Better Operation and Maintenance of Truck, Bus, Taxicab, Passenger Car and All Automotive Fleets

FEATURES IN THIS ISSUE:

A NEW Way to Analyze Brake Lining Performance, by F. C. Fiechter • How Managerial Control Will Reduce Accidents • Good Advice to Those Who Reclaim Oil • Two-Hour Valve Inspection Cuts Costs • How to Segregate Garage Expenses, by L. V. Newton • Factory Information on Cam-and-Lever Steering Gears • Question-of-the-Month Reports on Jacks, Hoists, Lifts and Pits • Trouble Shooters' Department • And Our Usual Co-Operative Departments •

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★

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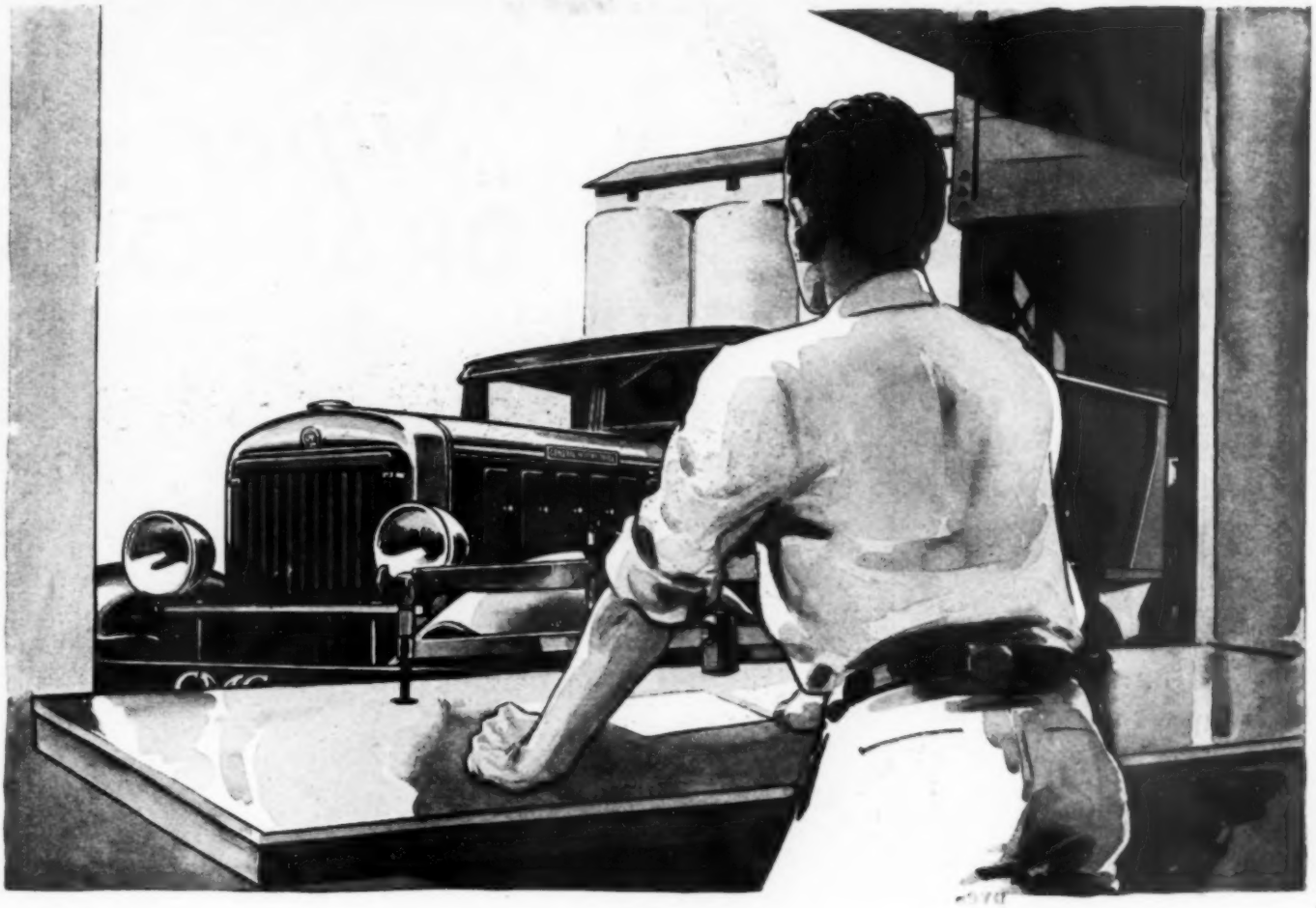

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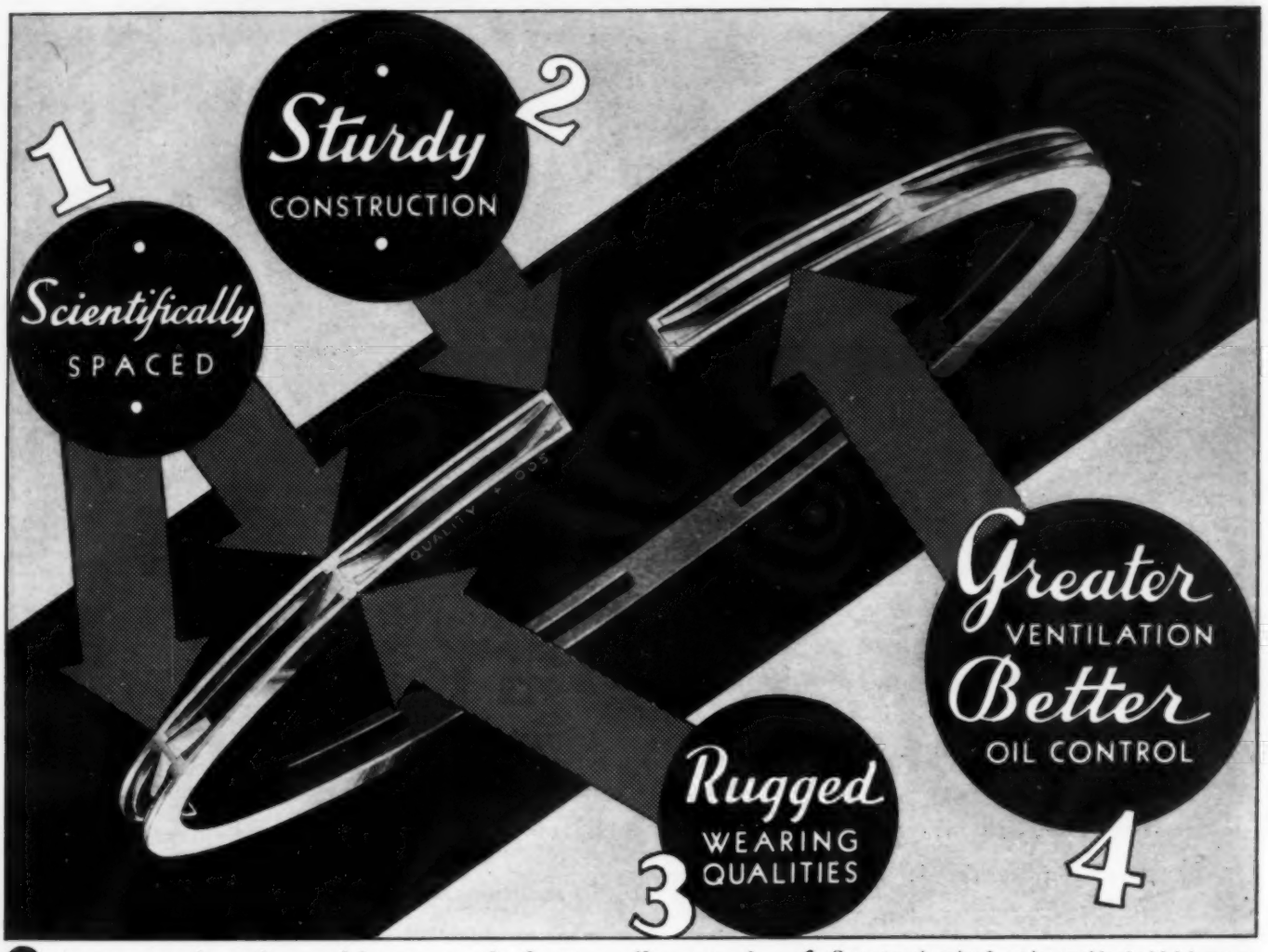

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Say "I saw it in FLEET OWNER"—It Helps!

The

FLEET OWNER

Published Monthly in the interests of Automotive Fleet Owners who maintain their own Repair and Service Shops and devoted to the better Operation and Maintenance of Truck, Trailer, Bus, Passenger Car, Taxicab and all Automotive Fleets.

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Drive it over ruts, bumps and cobble stones fast or slow. Give it a severe road test.

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Stabilizer will make it steer like new. Give your truck driver a chance. Don't expect him to make time yet avoid accidents when it takes super-human efforts to hold the truck to the road.

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We have had considerable trouble with front end shimmy. Altho we overhauled the front end of these trucks, replacing new bolts, bushings, etc., we had been unable to eliminate trouble.

Last month we purchased several No. 6 Universal Ball Bearing Stabilizers through your distributor, Wm. Schukraft & Son, and we must admit that this has eliminated all of our shimmy trouble, also our drivers state that the truck is much easier to handle, especially on cobble stone streets.

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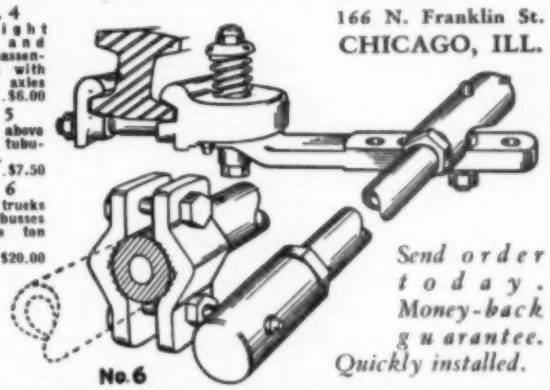

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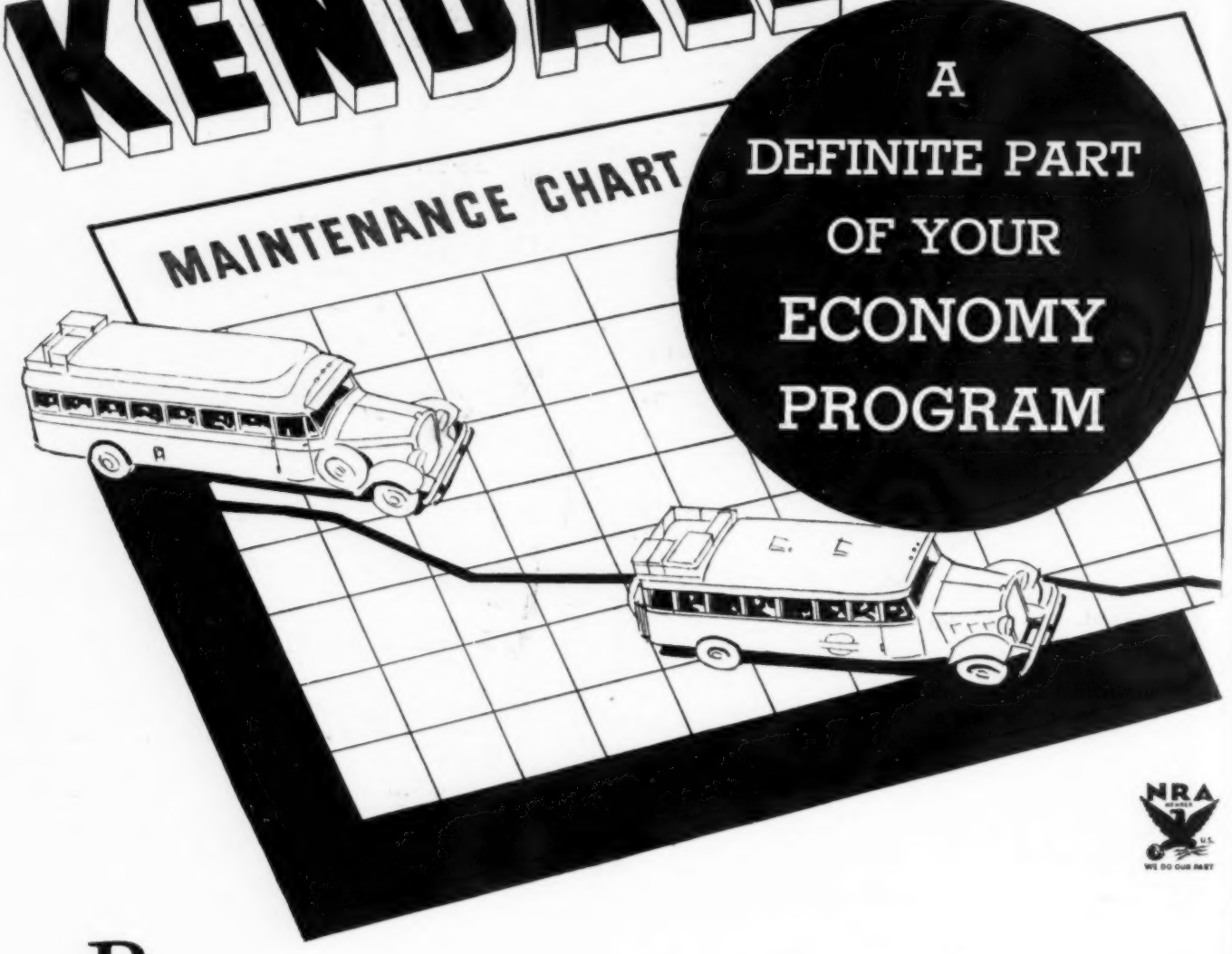

BETTER times are coming, we all hope and expect. But meanwhile, most bus and truck operators find it necessary to cut maintenance costs to the bone.

Kendall Oil will help you do it. For Kendall, in practically every fleet where it has been given a test, has proved its ability to give better lubrication . . . more economically.

The superb quality of this oil which is refined by special processes from the finest and costliest crude in the world (Bradford Grade of Pennsylvania), results in a new kind of economy for you. Not a lower oil cost per gallon . . . for Kendall usually costs more per gallon than ordinary oils. But a lower oil cost *per mile* . . . because of the exceptionally long mileage Kendall gives. And you'll find, too, that with Kendall in your equipment, you'll have fewer repair bills to pay and fewer costly road delays.

We invite you to test Kendall in your own equipment. See how it lowers your running costs, and assures magnificent lubricating performance always. Then we believe that you, too, will make Kendall Oil a definite part of your economy program.

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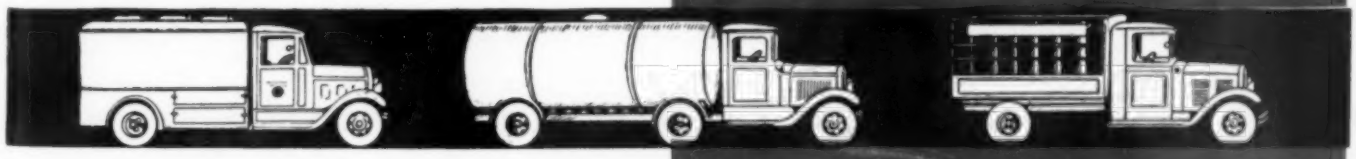
Now Ditzler gives you Ditzco Enamel Quickset—a spraying enamel which dries dust-free in 30 minutes. Both quality finishes, unexcelled in ease of handling, covering qualities and durability.



Fleet owners are reducing ton-mile refinishing costs with Ditzco Enamels. Ditzler refinishing materials are available through the Ditzler nation-wide distributor service.

Ask for more information.

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In addition to its longer service life, Ross has the advantage of permitting greater ease and accuracy of adjustment—when adjustment becomes necessary. It is well known, too, that a truck or bus equipped with Ross is much more safely and easily steered. Nearly 100 bus and truck manufacturers have adopted Ross as standard equipment. Write for information regarding Ross Gears for replacement.

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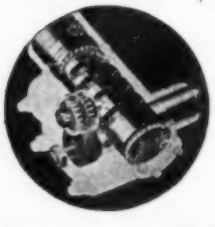
ROSS



CAM & LEVER STEERING

Say "I saw it in FLEET OWNER"—It Helps!

"COVERING A CONTINENT"

AMERICANS are the world's greatest magazine readers. Each month, each week, millions of magazines are moved from the printing presses to the news-stands of the nation. *Simultaneous national distribution of periodicals!*

Though it be printed in New York, a magazine is put on sale on precisely the same day on the news-stands of Portland, Maine, or Portland, Oregon, through the smooth, unfailing service of the American News Company, Inc. This great distributing organization, through its 200 branches, serves regularly more than 75,000 retailers in the United States and Canada — and over 70% of these dealers every day by motor truck.

The American News Company, Inc., says: "Promptness is absolutely essential in our business. Promptness and regularity are the ingredients of our nation-wide operation in serving the dealer not only on time but most economically."

It is natural, then, that this alert organization should look with favor on International Trucks. Purchasing its first International in 1929, the American News Company, Inc., has reordered in increasing numbers and today its fleet of trucks includes 114 Internationals operating from its various branches.

Internationals have proved to American News their definite economy in day-after-day, fast, multiple-stop operation. And the after-sale service which keeps these trucks on the job provides further economies.

Very probably an International did its share in delivering this magazine promptly to you!

The Largest Company-Owned Truck Service Organization in the World is at the service of International Truck owners everywhere.

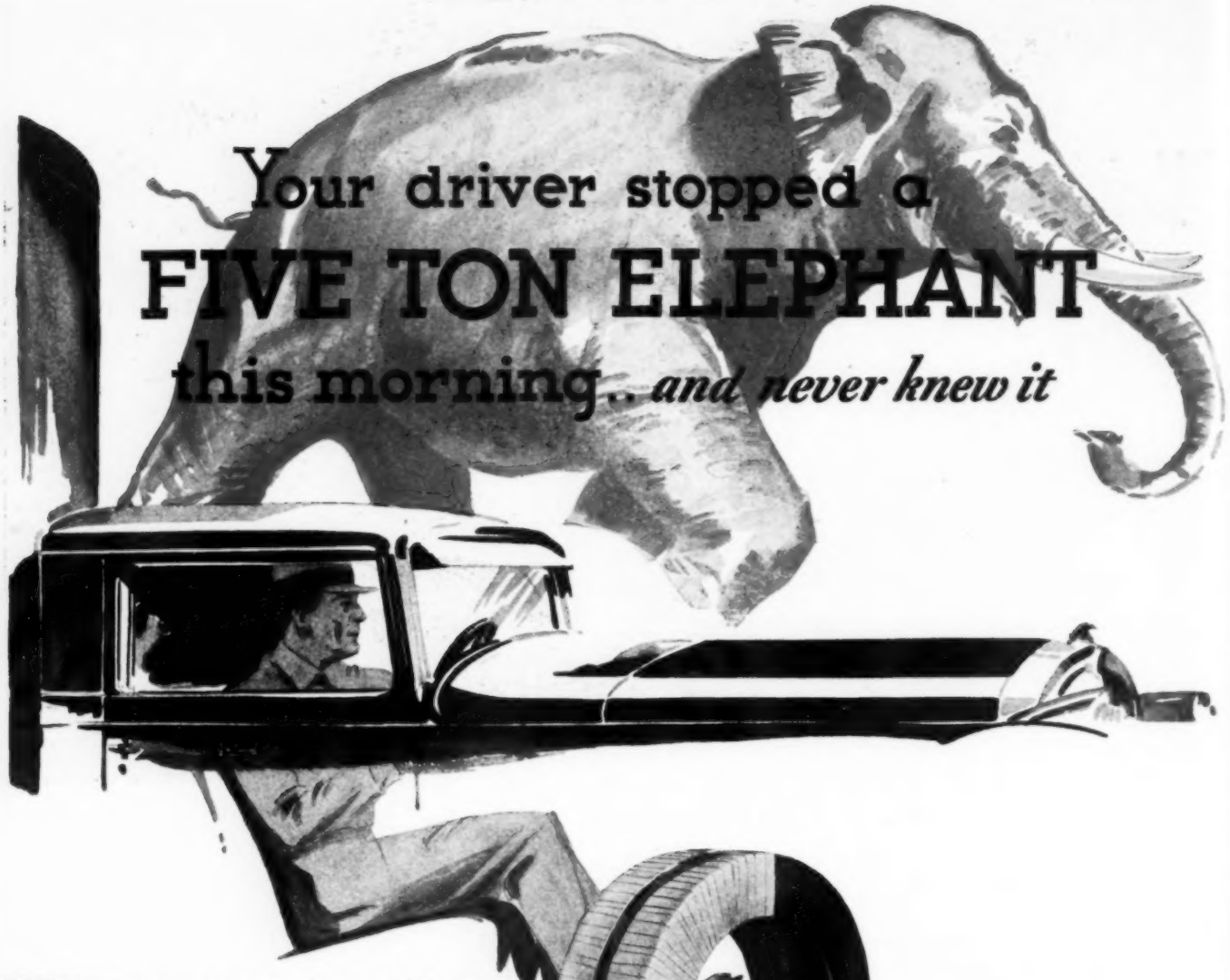
Regardless of where the American News trucks may operate, there is always an International Service Station nearby. The News Company's network of distributing points is matched by International Harvester Service — the largest company-owned truck service organization in the world. In the United States alone there are 198 Company-owned service stations where International-trained mechanics do everything from greasing to major mechanical maintenance, using factory-standard methods and factory-standard parts.

Let International Trucks bring economy and reliability to *your* hauling problems. Inspect the complete line, ranging from ½-ton to 7½-ton, at the showroom of your nearest International Branch or Dealer. Pick any model you want for a conclusive demonstration on your own job.

INTERNATIONAL HARVESTER COMPANY
606 S. Michigan Ave. OF AMERICA (INCORPORATED) Chicago, Illinois

INTERNATIONAL TRUCKS

Say "I saw it in FLEET OWNER"—It Helps!



Your driver stopped a FIVE TON ELEPHANT this morning.. *and never knew it*

WHAT he actually stopped was a delivery truck or car . . . a powerful, lunging, mechanical beast-of-burden. Your truck or car . . . that if uncontrolled by the brakes could smash everything in its path with the brutality of a giant jungle beast. And the *grip* that stops when his brain says "stop" is the grip that the brake lining gives.

When you translate the stopping of a car into terms of what such an accomplishment actually represents, you'll appreciate why Thermoid F-M-L Brake Lining is engineered to halt the fastest and the heaviest of these modern mechanical mammoths that speed along our highways and through our busy streets. Thermoid gives immediate soft-pedal action and maintains it throughout life. Thermoid won't fade out . . . won't grab in damp weather . . . won't score brake drums. It is one lining . . . road conditioned in the factory . . . for all motor vehicles. When you *visualize* you *realize* that Thermoid is the lining for your drivers to *use* . . . the lining for *you to specify*.

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Factories and Main Offices: TRENTON, NEW JERSEY

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Thermoid BRAKE LINING

HEAVY DUTY BRAKE BLOCKS | HEAVY DUTY FAN BELTS | HEAVY DUTY CLUTCH FACINGS | HEAVY DUTY RADIATOR HOSE

VOL. 12
NO. 1

The FLEET OWNER

JAN.
1934

DEVOTED TO THE BETTER OPERATION AND MAINTENANCE OF TRUCK, TRAILER, BUS, TAXICAB, PASSENGER CAR, AND ALL AUTOMOTIVE FLEETS.

Stripping *the* Thread » »

(The Editor's Column)

Breathes there a man with soul so dead,
Who never unto himself hath said,
When on a bolt, he stripped the thread:
"*@$..%x ')x**$ v¼"*'$$"-*oo"

RIGHT DOWN OUR ALLEY

● It was our good fortune last month to witness a debate, sponsored by the Automotive Service Association of New York, the subject being: "*Resolved: That Self Service of Fleets Assures Maximum Maintenance Efficiency.*" We have always contended that self-service of fleets *does* assure maximum maintenance efficiency, provided, of course, that the fleet consists of ten or more vehicles and that its operation is more or less centralized with the vehicles operating under the control of the head of the firm or department. Although, in our humble opinion, the affirmative side of this question needed no further acclamation, the arguments advanced by the affirmatives were somewhat enlightening and very refreshing. The negatives went on record to concede that self service *is* more efficient, provided that the fleet has at least 50 vehicles and the operation does not extend outside of a 15-mile radius. And "could we write a book" on the subject. Of course, we're naturally biased, because if all of you were to close your shops tomorrow, yours truly would be out of a job. And so would you. But rather than try to present any of *our* thoughts on the subject, we're planning to present, in article form, the arguments advanced by the affirmatives, particularly those of the principal debater, our good friend Charlie Lyon, vice-president and general manager of Motor Haulage Company, fleet operators in Brooklyn, N. Y. And, if we are successful, we'll also present the side of the negatives, and you can be the judge and jury. You'll be interested to know that there was a "no decision" finale to this debate, principally because of the lack of an authoritative definition as to what a "fleet" really consists of. It is unfortunate that but a mere 300 souls were on hand to witness the debate, and more unfortunate that a great number of these people were *not* fleet operators, but men in the truck sales and service industry. By making available the "meat" of this debate, in article form, to our 18,000 fleet maintenance men throughout the country, we feel that we'll be "doing our part." At any rate, we're promising it and here's hoping that we'll have room for it in this, or an early issue.

●

WHAT'S IN STORE IN '34?

● Our little expense account has been heavily burdened of late, what with attending conventions and spending practically the entire months of November and December away from our desk. All for the purpose of locating (not creating) some *real* editorial material for your favorite publication in 1934. A visit to the fleet garage of John Wanamaker, Inc., of Philadelphia, was our most outstanding one. We thought we knew a lot about fleet maintenance, but said visit brought us down a peg or two and reminded us of the fact that one can *always* learn more. To put it mildly, our visit proved well worth while. We won't try to tell you about it on this page, but will let their fleet manager, Mr. F. C. Fiechter, do it, as he has so graciously volunteered. The first of his articles outlines the splendid job they have done along the lines of rating and checking brake lining performance, in conjunction with that all-important factor—the human element. The story appears on page 14 of this issue. We know you're going to read it thoroughly.

●

ONLY THE BEGINNING

● But, as Captain Henry would say, "this is only the beginning." Other articles coming from the House of Wanamaker will include: "*Cadmium-Plating of Small Parts to Insure Longevity*"; "*Our Experience With Motor Oils*"; "*The Adaptation of New Equipment to Meet Individual Requirements*"; "*How We Determine the Efficiency of Various Drivers*"—and many others that are sure to tickle the palates of the most blasé and learned of fleet executives. One of the easiest things to do is to visit a fleet garage and write an article telling all about how the vehicles enter the shop, are cleaned, dismantled, overhauled and reassembled. The usual articles of this type also relate such startling information as to how many screw-drivers there are in the shop and how many fly-specks there are on the wall. All of which has become very stereotyped and hackneyed to the fleet manager of 1934. It's the *unusual* that we're all after and we believe we've struck it down in Philly. That rising vote of thanks that we talked about a few months ago certainly appears to be coming to you, Mr. Fiechter.

●

PASTE IT IN YOUR HAT

● If we had a column entitled "Pointed Paragraphs" we'd be sure to include this paragraph, which appears elsewhere in this issue: "*We are convinced that there are fewer poor brake linings and more good linings made, than given credit for by fleet operators. The fault does not belong to the manufacturers of brake linings to the extent commonly believed, but rests to a much greater extent with the fleet owner.*" And if you look hard enough for it, you'll get a big surprise when you find that these are the words of a fleet operator and *not* the echoes of a brake lining sales manager.

●

H. Clay Fischer
Editor

●

Keeping Track of Brake Applications

By F. C. Fiechter,

Fleet Manager, John Wanamaker, Inc., Philadelphia, Pa.

How We Developed a Simple Means of Recording Brake Applications for Comparison With Actual Delivery Stops • And the Things It Revealed

•

HOW should brake linings be rated? On a mileage basis, or by actual results based upon performance and wear in actual service?

In trying to answer this question many fleet operators have often been led astray. Most of us have purchased brake linings of one or more brands or makes because someone told us that they lasted for more miles than some other brand. Or because in one or more cases we have noted unusually long life, estimated in terms of miles or years of service, before the linings wore out.

Too often, many of the so-called "long-life" brake linings have succeeded at the expense of rapid brake drum wear; or mechanical fatigue; or with accompanying failures of parts in the more vital and expensive units; to say nothing of abnormal and premature wearing out of tires.

In order to ascertain facts concerning brake lining wear and depreciation we found that more definite methods of check-up needed to be used. We felt that we should know how often the brakes were being used, and the purpose or intent of such applications. We felt that it was pertinent to learn how our various drivers differed in their use of brakes; also what the relative differences were, insofar as the uses of brakes in both city and suburban operation were concerned. Another thing we wanted to find out was the ratio of the number of brake applications to the number of delivery stops made.

The first step we took to provide a definite means for ascertaining such information was to design two special recording instruments. One was an adaptation of the well-known "Servis-Recorder" to brake performance—by equipping it with a secondary stylus, built right into it. The regular stylus that records running time and idle time was left intact. The additional stylus which we had put in, records each brake application and thereby shows the relation between brake applications, and running and idle time.

This chart shows that in making 276 delivery stops, the driver made but 344 brake applications. Although the route was in West Philadelphia, within the city limits, this low ratio of brake applications prevailed. The route covered 13 miles and 3 gallons of gas were used.

Compare the figures on the chart above, with those of another driver, on another route, as shown on this chart. For making 135 deliveries, the brakes were used 473 times. Of course, the route was longer, being 102 miles and 14 gallons of gas were used. This route was in New Jersey. The outer circumferential markings on each chart indicate running and idling time. The inner ones are the brake applications. Figures from the counter are written in, as shown.

In other words, this combination shows when the vehicle was in motion and when it was stopped. It shows how often the brakes have been applied for slowing-up in traffic, approaching dangerous intersections and stops in traffic, or delivery stops.

Operation of the secondary stylus is attained electrically through a solenoid connected into the stop-light circuit. Therefore, each time the brake pedal is depressed, the stop-light lights and the electrical circuit through the solenoid is closed, causing the stylus on the recorder to indicate the brake applications on the chart.

The second step we took to get an actual count of brake applications per day, was to install an electric four-digit counter into the same stop-light circuit, so that besides indicating brake applications on the waxed card of the Servis-Recorder, an actual count would be available by reading the figures on the counter.

The illustrations accompanying this article show a few of the waxed charts taken from typical day's

(*Continued on page* 41)

BIG BRUTE "X-RAYED"

revealing 10 ignition safeguards for buses and trucks

STUDY for a moment this "X-Ray" picture of the Big Brute Coil. Here is design that respects the importance of the coil on the whole ignition system of a truck or bus. Here is energy, power, dependability to a degree never before obtainable in any coil.

Power? If cylinders could talk they would tell you what a hefty, man size super-spark this coil delivers; how it makes cold weather starting easier . . . pick-up, faster . . . running, smoother and livelier.

Energy? The American-Bosch Big Brute Coil has energy to spare . . . reserve energy that maintains top-efficiency ignition even at highest operating speeds. In today's high speed 6 and 8 cylinder engines such reserve energy becomes almost indispensable if failure is to be avoided.

Reliability? Lean mixture or rich mixture . . . worn or perfect electrodes . . . it makes no difference to the Big Brute. It continues to fire the same high-powered, super-spark under conditions where ordinary coils not specially designed for truck or bus use could not; nor could they be expected to.

Examine again the features of the Big Brute. Consider how they can help you banish costly ignition troubles. We will be glad to send you booklet and additional information . . . mail the coupon below.

Screw-type, insulated, lock connector for high tension terminal.
Extra long flash-over distances.
Heavy moulded insulator.
Brass low tension terminal nuts — for screw-driver or wrench—lock-washer.
Soft rubber shroud protects high tension terminal.
Heavy steel mounting plate —cadmium plated against rust.
Heavy brass sealing ring keeps out dust and moisture.
AMERICAN BOSCH COIL
6 VOLTS
Can also be mounted direct by removing this plate.
This coil does NOT require the use of special condenser or contact points.
Rugged cast-iron housing increases efficiency. Insures low temperature. Wt., 5 lbs.

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PRODUCTS manufactured by the UNITED AMERICAN BOSCH CORP., bear the trademark shown above.

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- ☐ American-Bosch Condensers
- ☐ American-Bosch Battery Charger
- ☐ American-Bosch Magnetos
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- Bosch Ditch & Fog Light ☐
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PRODUCTS manufactured by ROBERT BOSCH A. G., bear trademarks shown above. Sold by United American Bosch Corporation.

WRITE NAME AND ADDRESS IN SPACE BELOW

Say "I saw it in FLEET OWNER"—It Helps!

By L. V. Newton,
Byllesby Engineering & Management Corp., Chicago, Ill.

Effecting Economies in the Fleet

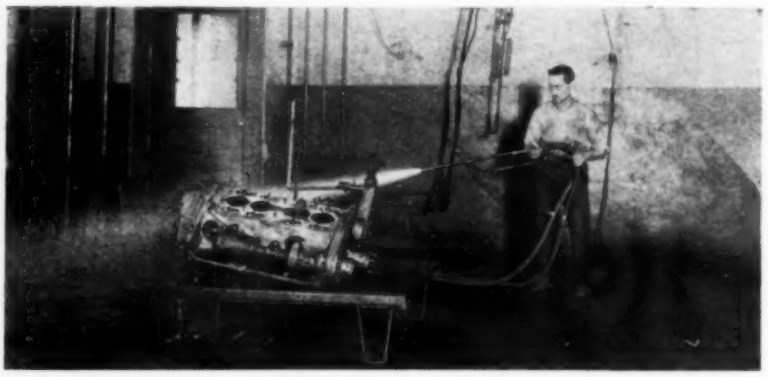
Article IV: Garage Expenses and Fixed Charges • A Simplified System That Covers Miscellaneous Costs • Some Notes on Depreciation Reserves

IN our accounting procedure the cost of labor used in washing, gassing, greasing, and oiling motor vehicles; also labor involved in delivering, picking up and parking vehicles in the garage is charged to one general account which we call "Garage Expenses."

We also charge the cost of miscellaneous supplies such as the following to this account largely because it simplifies accounting: Greases and lubricants other than motor oil; Penetrating oil; Battery water; Rags and waste; Sponges; Chamois; Nickel and brass polish; Body polish; Kerosene; Rubber boots; Rubber aprons; Graphite; Water hose; Brooms; Floor brushes; Shovels; Soap; Toilet paper; Towels; Mop handles and mops; Ice; Drinking water; Fire extinguisher maintenance; Electricity for lighting purposes; Electric light bulbs; and Cost of water.

Upkeep of electrical charging equipment, gasoline pumps, and tanks, motor oil pumps and tanks, grease dispensing equipment, air compressors, etc., is also charged to this account.

Obviously, the cost of these garage expenses can only be reduced by decreasing labor and material costs.



"Washing engines and parts is an important part of our maintenance work. Vehicles and parts must be kept clean, otherwise maintenance cannot be good. We have found power washing devices, either by power-driven pumps, or the combination of water and air under pressure, to speed up cleaning operations very materially, particularly on trucks and buses. Steam, hot water and air pressure, and kerosene and air pressure are used on engines with success."

Washing of vehicles and cleaning of engines is an important part of our maintenance work. Vehicles must be kept clean otherwise our maintenance is not good.

We have found that power washing devices such as increased water pressure obtained by power driven pumps, or the combination of water and air under pressure, speed up very materially the cleaning of accumulated mud and dirt from the chassis. For washing buses we have found that running them through a spray or shower simplifies and speeds up the washing operations.

Generally speaking, I believe that we have progressed a great deal further in washing buses economically than we have in washing passenger cars and trucks. This may be because the sizes of the buses are more nearly uniform. I feel, however, that the spray or shower bath type of washing equipment when properly developed for passenger cars and trucks, combined with pressure washing of the chassis presents vast possibilities of reducing washing time.

Engine cleaning is being accomplished by various means depending upon the size and nature of our garages. Steam, hot water and air pressure and kerosene and air pressure are the three means employed. The two systems first mentioned are preferable unless the wash rack has adequate ventilation in which case the use of kerosene and air pressure is quite satisfactory.

The cost of miscellaneous supplies charged to garage expense can be reduced through elimination of waste and unnecessary use of materials. This resolves into a problem of supervision. Likewise the unnecessary use of light and water can be reduced.

The equipment needed for economical and adequate lubrication has already been outlined, hence further comment is unnecessary.

Rent, Insurance, Licenses and Taxes, depreciation Reserve, Interest and General or Administratice Expense are usually termed "fixed charges." In this paper none of these items will be discussed other than Depreciation Reserve.

The purpose of a depreciation reserve is to build up out of earnings a fund ample to make replacement of vehicles when they are worn out or are no longer economical to operate.

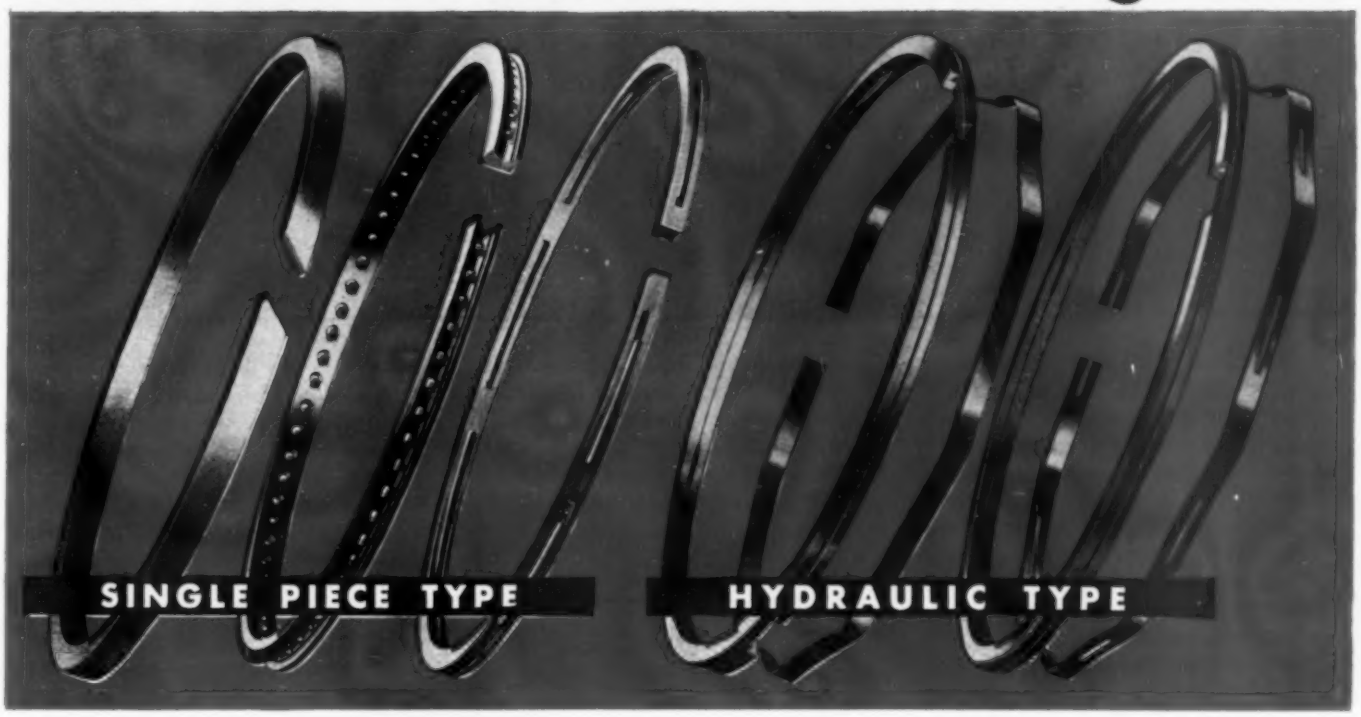
There are various methods employed in setting up this reserve; some depreciate their vehicles on a time basis, others on a mileage basis and still others on a combination of time and mileage. I prefer the latter scheme inasmuch as I feel that it takes cognizance of obsolescence, also the deterioration that takes place in vehicles with age under low usage conditions.

The amount of the reserve to be set up is dependent upon the operator's maintenance procedure and his policy of making replacements.

I have seen some formulas offered to govern arithmetically or otherwise the proper time for replacements to be made. I have yet to find one that can be generally applied. There are too many variables and qualifying factors that must be given recognition. It is

(*Continued on page* 43)

The COMPLETE Piston Ring Line



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Philadelphia

Managerial Control *will Reduce* Accidents

Managerial Control of Fleet Accidents is Vitally Necessary, As Are the Various "Tools" With Which to Carry It Out

By Robert Clair,

Highway Safety Supervisor, Liberty Mutual Insurance Co., Boston, Mass.

TRUE managerial control as applied to accidents is a comparatively recent development. An application of it to our fleet problems will give us almost everything we can desire in the way of efficiency.

In support of this statement, let us consider the questions:

1. *What has fleet safety in common with industrial safety?*
2. *How has managerial control of accidents developed?*
3. *Of what does modern managerial control consist?*
4. *How may we apply this efficient method of accident control?*

By way of preface, I have known many of the taxicab operators who originally formed what is now the Delivery, Taxicab and Bus Section of the National Safety Council. I have followed its growth from the beginning in 1922. These men, like many of the later members, believed that the problem of fleet safety was something unique and apart from the industrial problem. This feeling has been maintained, but it is only partially true.

We have prepared a chronological chart containing a comparison of the histories of the industrial and the commercial fleet safety movements. To conserve space we need not review this in detail, but merely consider the conclusions which the chart indicates. These are:

1. *Organized industrial safety work is about eight years older than organized fleet work (1906-1914).*
2. *It required 22 years for industry to arrive at a general recognition of the effectiveness of managerial control of accidents (1906-1928).*
3. *Fleet work arrived at a comparable conclusion in respect to managerial control in 18 years (1914-1932).*
4. *Fleet operators could have reduced this 18-year period of development to 14 years by more closely following the developments in industry. There should have been a coincidence of conclusions regarding managerial control of accidents in 1928.*

Managerial control consists, in the first place, of a clear understanding of two things:

First, the definition of a vehicle accident, as adapted from the definition of an industrial accident; second, the actual cost of a vehicle accident.

As early as 1919 we find an industrial accident defined as "an interruption to production." The fleet executive or safety man has probably always ignored this as not being pertinent to his operations.

As a matter of fact, the success of any commercial fleet is fundamentally dependent upon its ability to produce miles. Inefficient miles destroy and delay cargo, make customers dissatisfied with service, and adversely affect volume of busines. Accidents, more than anything else, prevent the commercial fleet owner from producing efficient miles. For profitable fleet operation, inefficiency must be removed and therefore accidents must be eliminated. There can be no compromise with the word *must*.

In regard to the cost of accidents, the modern fleet operator must again heed the advice of industry. In 1927 it was demonstrated that the incidental accident cost paid by the employer directly is four times the amount represented by compensation and liability claims and medical treatment.

Do we really know the cost of the accidents reported by our drivers?

The superintendent of maintenance of a fleet operating more than 200 delivery trucks, tells me that the average cost of each truck accident reported is $80, which represents a direct loss to the fleet owner on items on which he cannot or does not carry insurance.

With the help of another maintenance superintendent we worked out the usually uninsured cost of a typical intersection collision. We arrived at a figure of $397. Although this accident may have been more severe than the average, some indication may be had regarding the volume of such costs which come directly out of the fleet owner's pocket.

These few indications of the true cost of vehicle accidents will serve our immediate purposes. We will not even mention other cost items,

Fleet Safety "Tools"

THESE are the "tools" of the fleet operator's trade, says Mr. Clair:

- Safe driving bulletins on general hazards.
- Mimeographed bulletins on local and seasonal hazards.
- Drivers' bonus plans.
- Drivers' group contest for a trophy or other prize.
- Drivers' awards or buttons.
- Safe driver certificates.
- Method for selection of drivers.
- Driver training or education.
- Drivers' Safety committees, either fact-finding or courts of inquiry.
- Psychological tests.
- Road tests.
- Personal letter messages to drivers.
- Safe driving rule books.
- Driver's request for repair form.
- Driver's meetings, rallies and dinners.
- Statistical studies and cause analyses.
- Blackboard demonstrations of accidents.
- Accident-prone driver studies.
- Accident spot maps.
- Dashboard slogan cards.
- Physical examinations.

Use these "tools," in any given combination, and they will succeed if the proper moving spirit of managerial control supports them.

Sherwin-Williams Kem scores with Bakers!

"TRUCKS LAID UP ONLY HALF AS LONG

when finished with Sherwin-Williams Kem Transport Enamel..."

Major Advantages of Sherwin-Williams Kem Transport Enamels

1. MORE ECONOMICAL: Cover solid in one coat, even when reduced 33⅓% for spraying. High gloss without rubbing—saves labor. Trucks laid up only about half as long. Less time in the shop—more time on the job.

2. EASY WORKING CHARACTERISTICS: Sprays easily because of excellent build. Levels to uniform film. Can be brushed for reveals and belts. Suited for application on wood, metal or composition. Can be applied over old finish with minimum operations. Double coat sprayed continuously

3. MORE ATTRACTIVE APPEARANCE: Porcelain-like finish. Looks cleaner and stays cleaner longer. Uniform degree of gloss in all colors. *Better advertising value.*

4. *GREATER DURABILITY:* Sherwin-Williams Kem Transport Enamels give *longest life of any enamel finish.* Colors are fast to light Excellent gloss retention on exposure. High resistance to oil, salt water and gasoline. Refinishing needed less often—*lower maintenance* cost. Even greater durability can be obtained by varnishing with Kem Transport Clear Finishing Varnish.

• • •

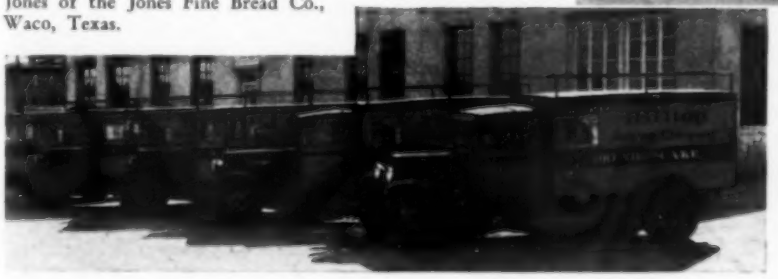
Every fleet owner should have the complete story of Sherwin-Williams Kem Transport Enamels, especially developed for transportation equipment. Sent without cost or obligation. Write for it on your company letterhead. The Sherwin-Williams Co., Dep't. 623, Cleveland, Ohio.

"After having our fleet of trucks repainted I want to tell you that fine results were obtained with fine materials, namely Sherwin-Williams Kem Transport Enamels", writes Mr. R. G. Smith, Secretary-Treasurer of The Smith Baking Company, Inc., of Lincoln, Nebraska. . . . "We have always considered our delivery equipment as so many traveling billboards. To keep up their fine appearance we formerly used slow-drying enamels. . . . This year we used Sherwin-Williams Kem Transport Enamel and are well pleased with it. With Sherwin-Williams Kem Transport Enamel, it was necessary to lay the trucks up only *half as long* as when using other slow-drying enamels. We also find that Sherwin-Williams Kem Transport Enamel is holding its superior finish *longer* than other paints we have used."

SHERWIN-WILLIAMS OPEX KEM Automotive FINISHES

STANDS UP UNDER INTENSE HEAT AND SUNSHINE:

"We have recently been using Sherwin-Williams Kem Transport Enamel on our fleet of trucks and have found the same the most satisfactory paint we have ever used for that purpose", writes Mr. George O. Jones of the Jones Fine Bread Co., Waco, Texas.



S-W KEM STOOD TEST BETTER

. . . "We have repainted our entire fleet of trucks with Sherwin-Williams Kem Transport Enamels", writes Mr. Robert M. Poe, President of the Hilltop Baking Company of Waco, Texas . . . "after months of hard wear, this material has stood the test better than any other piece of goods we have ever used . . ."

SHERWIN-WILLIAMS KEM TRANSPORT ENAMELS

Say "I saw it in FLEET OWNER"—It Helps!

HOW to REDUCE FLEET ACCIDENTS (*Continued*)

such as increased insurance rates and loss of good will, which also are apt to follow vehicle accidents.

The fleet operator must banish from his mind the idea that it is necessary for him to give his drivers some special educational, psychological, monetary or inspirational treatment to enable them to drive carefully. His accident problem presents fundamentally a problem in non-productive operating costs elimination. Reduced to this form, our fleet safety problem only needs some direct and aggressive executive control applied as you would apply it to any other operating cost problem.

On the basis of our country-wide experience, it has been only during the last year or two that we have generally found fleet operators becoming aware of the efficiency of direct managerial methods for controlling their vehicle accident costs.

There is a type of fleet official who stamps his approval upon some sort of safety program and then passes along to the next business of the day, thinking that his accident problem has thereby been solved. It has not! The mistake made by such officials is obvious. A *passive* managerial interest or approval will not make any program permanently effective.

There is another fleet executive or engineer who works hard at the business of accident prevention. He becomes quite discouraged after having spent time and effort, as well as money, on elaborate educational campaigns involving rallies, high pressure speakers, safety committees, and all the other fixings with no satisfactory results forthcoming. These men finally decide that there must be some trick, or stunt, or secret, which they need to put their accident prevention work on a paying basis.

This second man makes a mistake because, going back to our earlier distinction, he thinks that the "tools" used in the actual carrying out of a safety program are the things that get the results. This is not true, but what *does* get the results is the managerial control that gives these "tools" their authority. We must continue to use these so-called "tools" of our trade in our interpretive work. They are common property.

The National Safety Council and most of the insurance companies can supply almost endless lists of them.

I believe that any given combination of these "tools" or procedures will prove successful among any given group of drivers if the proper moving spirit of managerial control supports them.

It is difficult to outline the details of just what steps a fleet operator or engineer should take to install a system of managerial control. There are a wide variety of local conditions to be considered. Managerial methods differ.

Based on the fact that vehicle accidents not only *can* but *must* be reduced and that the best control methods are the most direct methods, the highest fleet executive should begin by issuing an executive order or official set of rules governing automobile accidents. Directed to supervisors or individual drivers, these instructions must be clear and they must have "teeth." Disciplinary examples must be made as would follow the infraction of any executive order of a similar kind.

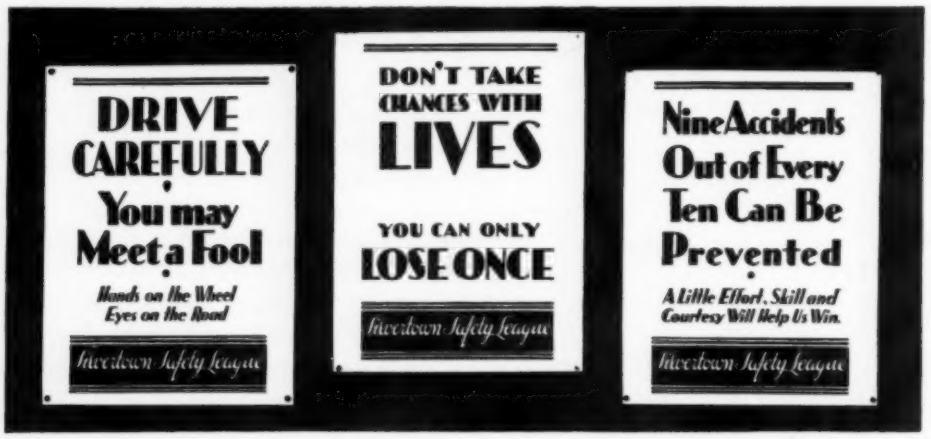
Please understand that we are not recommending hard-boiled methods. Discipline is necessary for effective control in any field of organized activity. We are using it in many other phases of our managerial activities. Such discipline is fair but firm. Why should we not be consistent and use it for the control of our fleet accidents? It works!

If we were to ask representatives of those fleets which were successful in winning trophies in last year's national inter-fleet safety contest, I venture to say that each of these men would give credit for their success to some specific "tool" which probably has been enumerated among those we have listed.

We need not be so much interested in the "tools" to which these men attribute their success. It does not make so much difference what sort of a safety committee they used, what kind of bulletins they distributed, how they analyzed their accidents, or whether or not they used individual driver awards. Whatever "tools" they used were undoubtedly dominated by the executive energy and the control methods of the fleet officials themselves. In other words, we can depend upon it that these fleets are efficiently operated fleets.

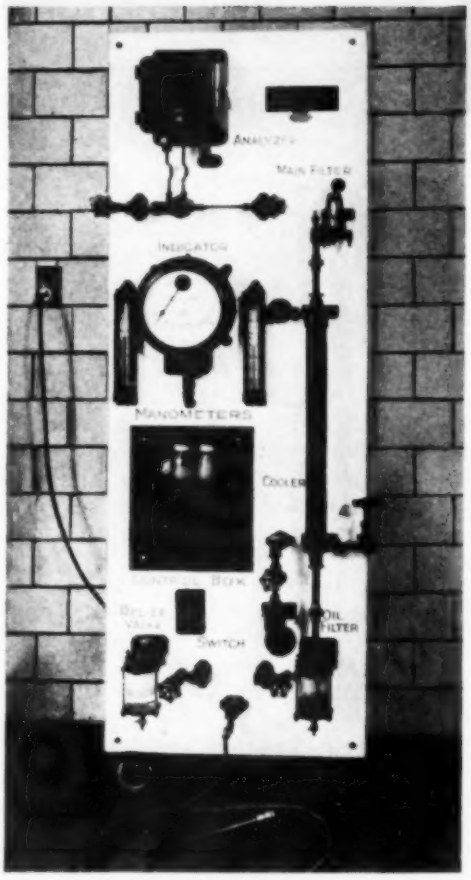
The manager of every commercial fleet has the direct and simple answer to his accident problem right in his vest pocket. This takes the form of a direct and aggressive system of managerial control applied as we are applying it in all other phases of our business. (Excerpts from a paper given before the recent Annual Safety Congress.)

In connection with its efforts to assist fleet owners in proper safety organization, the National Safety Council has developed a pocket booklet summarizing the essential rules of safe driving. Sample copy may be obtained. Write to National Safety Council, 20 N. Wacker Dr., Chicago.

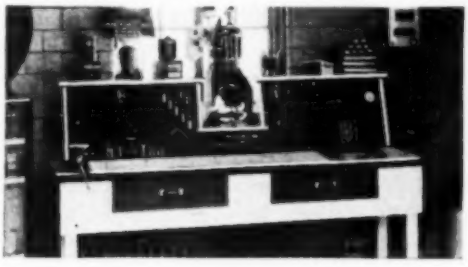

DRIVE CAREFULLY
You may Meet a Fool
Hands on the Wheel
Eyes on the Road
Silvertown Safety League
DON'T TAKE CHANCES WITH
LIVES
YOU CAN ONLY
LOSE ONCE
Silvertown Safety League
Nine Accidents Out of Every Ten Can Be Prevented
A Little Effort, Skill and Courtesy Will Help Us Win.
Silvertown Safety League

Posters are but one of the "tools" which, if properly applied, will go a long way to keep down the accident rate. These posters have attracted attention everywhere. Hundreds of fleet operators have requested additional copies to post in their garages and warehouses. The Goodrich Silvertown Safety League issues them and if you are interested in this free service, just drop a line to the Editor.

TO FLEET OPERATORS WHO WANT TO MAKE MORE PROFITS DURING 1934



Above: *the Power Prover.* Below: *Cities Service Tuning Tools and Precision Instruments.*



Read how more than 2500 fleet operators succeeded during 1933

THERE is a definite way for you to make more profit during 1934 because there is a definite way...a proved way...for you to cut your gasolene and oil costs and reduce maintenance expense. It is a method successfully proved during 1933 by more than 2500 fleet operators, large and small. That proved, successful way is—

POWER PROVER Service

This motor testing and adjusting service, offered exclusively by Cities Service, includes three distinct features: (1) An analysis of exhaust gases by the POWER PROVER; (2) A comprehensive 23-step Tuning Routine; (3) Use of exclusive and patented Cities Service Tuning Tools and Precision Instruments which make possible adjustments to the thousandth of an inch accuracy.

Results of this Service

From the more than 2500 enthusiastic fleet operators who have made POWER PROVER Service an established part of their maintenance routine come the following reports: (1) As much as 30% saved on gasolene and oil; (2) Interval between overhauls lengthened; (3) Unnecessary overhauls and repairs eliminated; (4) Quicker starting; (5) More power . . . particularly on hills under heavy loads; (6) Exhaust fumes eliminated; (7) Danger from Carbon Monoxide reduced; (8) Engine efficiency greatly improved; (9) Maintenance costs lowered.

These Benefits Open to You

During the past year operators of POWER PROVER fleets have saved hundreds of thousands of gallons of gasolene and oil and an amazing sum of money on maintenance. You, too, can cut your gasolene and oil costs and make substantial savings on maintenance by adopting POWER PROVER Service. The cost for this service is trifling . . . just a few cents per vehicle per month. So don't wait. Investigate at once. Write, wire or telephone for a demonstration of POWER PROVER Service on your own fleet. Do it today to be sure of more profit during 1934. Address your request to Cities Service POWER PROVER, Room **702,** 60 Wall Street, New York City.

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RADIO CONCERTS—*Fridays at 8:00 p. m., E. S. T., over WEAF and thirty-three N. B. C. stations*

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Cities Service Oil Company • Crew Levick Company • Cities Service Refining Company
Louisiana Oil Refining Corporation • A. R. Newcombe Oil Company

Say "I saw it in FLEET OWNER"—It Helps!

By Henry Rinn,
Reclamation Engineer, Anderson Motor Co., Baltimore, Md.

Let It Settle *before* You Reclaim It

The Longer We Allow Our Crankcase Drainings To Settle, the Less Work We Have in the Filtering Portion of Our Reclaiming Process

TOO much importance cannot be attached to the length of the time in which crankcase drainings, to be used for reclamation purposes, are permitted to settle out. Before we began to reclaim our used oil I had often noticed that when a drum of drainings had remained undisturbed for any length of time, the oil near the top would assume an appearance so near that of new oil that it would be difficult to distinguish the difference visually.

The reason for this change was more or less cause for conjecture on my part but since we were getting rid of our used oil as best as we could at the time, no attempt was made to investigate the matter. However, since we have learned just what reclaimed oil is and the advantages to be obtained through its use, the whole business becomes as plain as the nose on your face.

It is a widespread thought that some process takes place in the crankcase which tends to burn lubricating oil and thereby causes it to turn black permanently. This thought is just as far from the truth as would be the idea that two or three quarts of mud could permanently discolor a barrel of water. The fact of the matter is that discoloration in the crankcase is due to millions of small carbon particles and to atmospheric dust which must penetrate any space to which air has access.

The reaction of settling methods in both water and oil are almost identical, as the small particles of foreign matter in used oil will respond to gravity much the same as mud thrown into a barrel of water would respond. Muddy water will clear up if left undisturbed and so will dirty oil.

You cannot burn lubricating oil and have it left in any form but carbon so it necessarily follows as a matter of pure logic that since carbon is not a liquid there would be no crankcase drainings left if all the oil was burned up by the heat of your motor. It is also a fact which permits of no contradiction that these small carbon particles, which discolor oil, represent only that portion of oil which has been actually consumed by heat, and that if they can be settled out, they are not an integral part of the oil, and when removed will leave the remainder of the oil in excellent condition for reclamation.

As before stated, you can prove to your satisfaction that this form of dilution will practically remove itself by gravity, if you will set aside some of your drainings and leave them undisturbed for a while. We do not need to give much consideration to other foreign solids which may enter the oil while in use, as all of them being heavier than carbon, will reach the bottom of the settling apparatus before the carbon does.

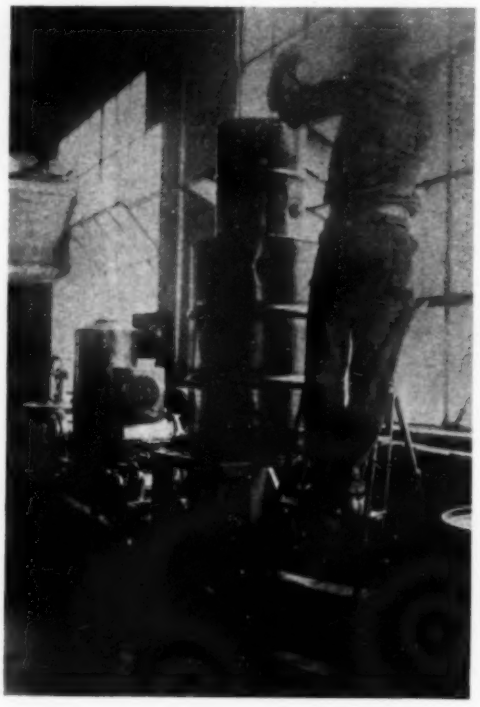
Hence we see that the importance of settling lies in the fact that the longer an oil is allowed to settle, the less work we are going to have in the filtering portion of our reclaiming process.

Of course it is understood that no amount of settling will have any effect on the liquid dilution contained in drainings, as its removal can only be accomplished by the proper application of heat. Since the removal of liquid dilutions such as unburned gasoline, water and corrosive acidic accumulations is absolutely necessary to the restoration of viscosity, fire and flash points, it will become apparent that heat treatment at the proper temperature and for the proper length of time is just as important to the proper reclamation as is filtration.

But that is another subject and one which we have no thought of in this article. We merely make the distinction between liquid dilutions and solid impurities in order that you do not confuse the two. Nevertheless both are of equal importance and must receive equal attention.

We are using an oil reclaimer which automatically applies first

(*Continued on page* 43)



THE importance of allowing crankcase drainings to settle before reclaiming cannot be stressed too strongly. The operator, whose shop is illustrated here, has provided a simple arrangement for pre-cleaning his oil. Two steel barrels are used—one of 20-gallon and one of 50-gallon capacity. These drums are connected together as shown, so that old crankcase oil, when placed into the smaller drum at the top, will drip into the larger one. The top drum is filled with alternate layers of excelsior and rags, to remove the bulk of the dirt. The oil then drips into the larger barrel where it is allowed to settle. A spigot, located about 12 inches up from the bottom, permits the pre-cleaned oil to be drained off, ready for reclaiming. The lower portion of the larger drum is the settling chamber, from which old oil and sludge can be removed at will, through a large valve located in the bottom of the barrel.

ARE YOU WRESTLING WITH BATTERY MAINTENANCE COSTS?

NOT all operators know that battery maintenance figures have a vital bearing on haulage costs. But it *is* significant that those who place the greatest emphasis on lowering their costs have standardized on Exide Batteries.

Countless millions of miles of service have proved the unfailing extra power, the freedom from trouble, the longer, more dependable and economical service that Exide Batteries deliver. Throughout the entire nation, in light delivery cars and in the largest trucks, in the thick of city traffic and in hauling across country, Exide Batteries are demonstrating the meaning of this phrase—WHEN IT'S AN EXIDE, YOU START!

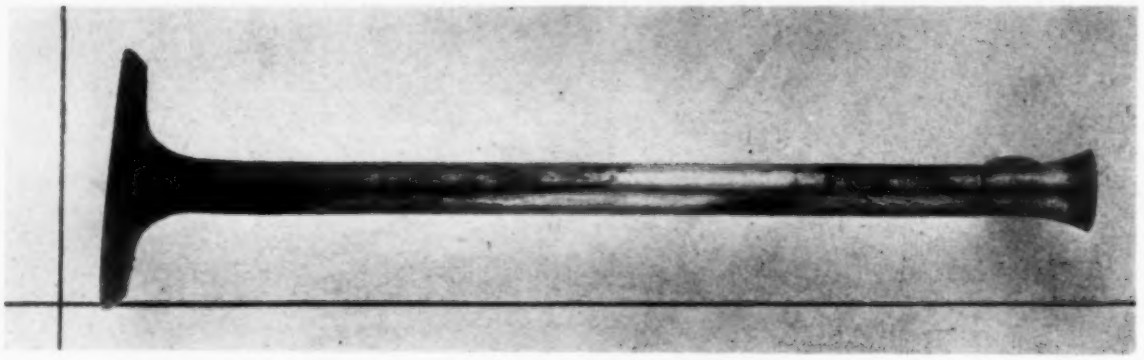
EXIDE ENGINEERING SERVICE
Can help you cut battery maintenance costs. Conducted by trained and experienced battery engineers, this service is available to fleet operators free of charge.

Exide
BATTERIES
FOR EVERY TYPE TRUCK

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

Say "I saw it in FLEET OWNER"—It Helps!

Two-Hour Valve Check-Up Cuts Costs



Here's an extreme case of valve warpage, caused by misalignment of the guide. Note the small amount of contact between stem and guide. The wear, being on one side of the stem, prevented the head from seating properly. The two lines which our artist has drawn will show how much out-of-square the valve has become.

By L. E. Galbraith,

Chief Engineer, Toledo Steel Products Co., Toledo, Ohio

FLEET operators of both commercial and passenger vehicles, ever interested in lower maintenance costs and improved service, can improve the efficiency of their units through periodic inspection of their valves and replacement of them when necessary. Unlike spark plugs, piston rings, and many other motor parts, valves have been considered immune to wear and good for the life of the vehicle. Such a supposition is erroneous.

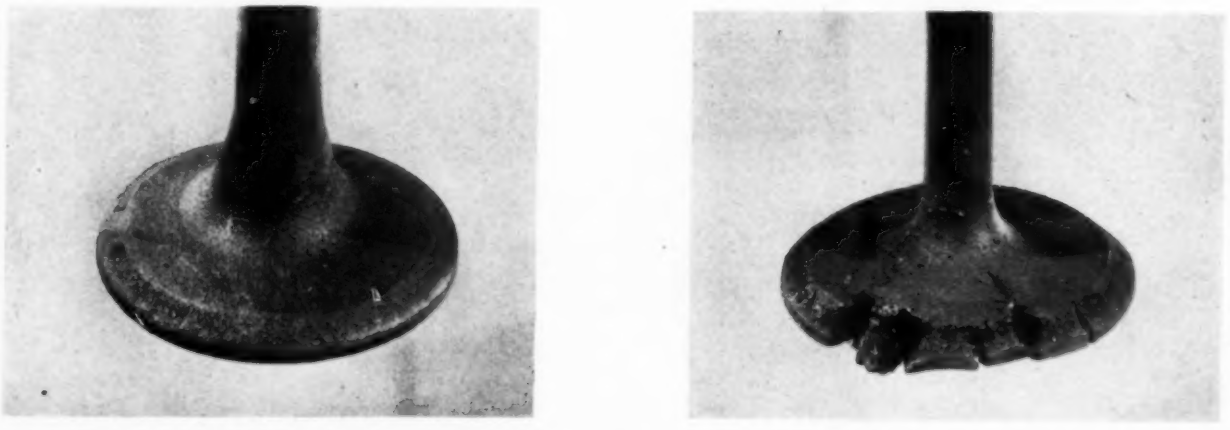
As the speedometer registers thousand upon thousand of miles, every part of the motor shows wear. Valves are no exception to this. However, it is possible by a well-planned program to increase immeasurably the efficiency of motor valves.

Valve troubles have a disastrous effect on maintenance cost sheets. Generally speaking, faulty valves result in the loss of motor efficiency. When not in good condition, the valves will soon burn themselves out. This necessitates new valves and possibly valve seat inserts. The cost does not stop here. Faulty performance may break the cylinder head, block, and score the pistons and cylinder walls. It is necessary to tear the entire motor down to remedy such a condition. Likewise, poor valves increase gas and oil consumption while power decreases.

It is dollar-wise to check valves before they affect other parts of the motor, for, regardless of the materials used in their manufacture, without proper installation and supervision, valves will not function satisfactorily over an extended period of time. Although it is impossible to set a standard figure, in no case should fleet operators permit a truck or bus to go uninspected until a faulty part of the valve mechanism seriously affects the operating efficiency of the engine.

It is essential to check valve tappet clearances every 5,000 miles. In this way, some of the common valve troubles can be detected before serious damage takes place. Even though the tappet clearance is

(*Please turn to page* 43)



A periodic two-hour valve check-up often eliminates two-day repair jobs, decreases repair cost and fuel bills and keeps the efficiency of the fleet at par. Here are two bad examples. At the left is a neglected valve, showing heavy scale on seat. This valve would be entirely burned away, such as the one at the right, if operated for even a short time. The one at the right is an extreme case of valve burning—a complete valve failure.

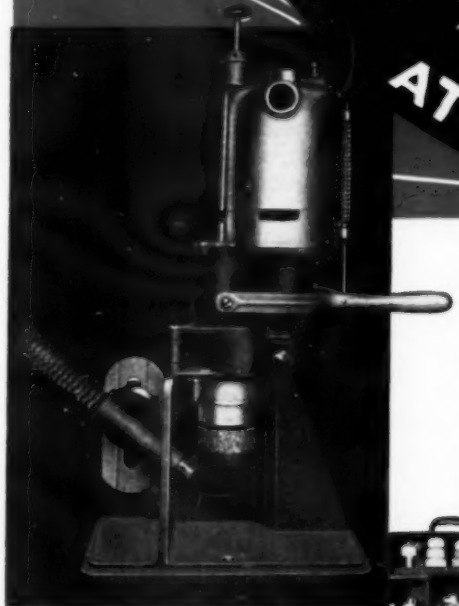
Genuine Factory Equipment
Is More Profitable In-Service

PRODUCTION PRECISION

HALL *ECCENTRIC* VALVE SEAT GRINDING METHOD

ADOPTED BY . . . . . CHRYSLER, CITROEN, CONTINENTAL, CURTISS-WRIGHT, DAIMLER-BENZ, FORD, G.M.C. TRUCK, HALL-SCOTT, INTERNATIONAL TRUCK, LEYLAND, PLYMOUTH, RENAULT, REO, WHITE TRUCK, WILLYS-OVERLAND AND OTHERS

AT SERVICE COST



Above: E-S Grinder and Diamond Dresser. Right: Standard and Special Sets complete in Metal Case. Ask your Jobber for price on Set you need.

When you purchase a Valve Seat Grinder, take a tip from leading motor manufacturers of America and Europe. They adopted the *ECCENTRIC* Valve Seat Grinder because no other equipment gave them the precision and economy their production requires. This same *ECCENTRIC* principle in the Model E-S Grinder brings production precision and economy to the service shop. When you buy a Valve Seat Grinder it will pay you to do as the factories did: look at them ALL, then buy a HALL. If it's best for production, it MUST be best for service. Ask your Jobber or write the factory for complete information.

HALL MANUFACTURING COMPANY
1620 Woodland Avenue, Toledo, Ohio
In Canada: Walkerville, Ontario

HALL *ECCENTRIC* Valve Seat Grinder

Say "I saw it in FLEET OWNER"—It Helps!

Servicing Cam-and-Lever Steering Gears

By S. L. Bradley,
Ross Gear & Tool Company, Lafayette, Ind.

The First of a Series of Factory-Sponsored Bulletins • How to Service Cam-and-Lever Gears With One-piece Housings

THIS is the first of a series of three factory-sponsored articles covering Ross Cam and Lever Steering Gears. It will cover instructions for the lubrication and adjustment of the cam and lever steering gear having one-piece housing.

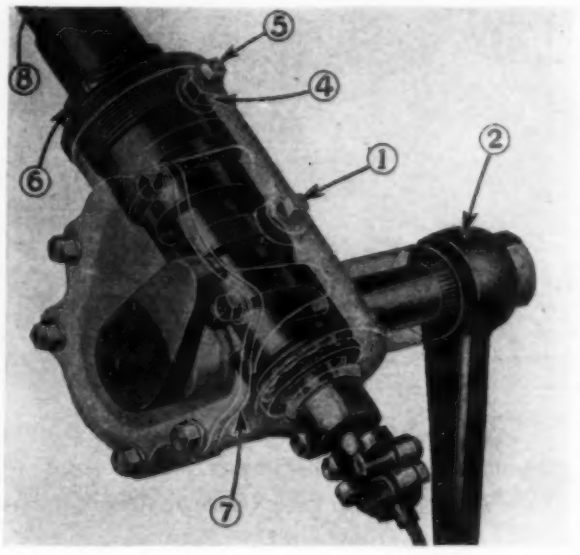
1. The Ross Cam and Lever Steering Gear will render efficient service with very little care if it is not abused. Ample lubrication of the proper grade will prevent excessive wear, also rattle. Adjustments should not be made unless clearly necessary, and then these instructions should be followed carefully. Improper adjustments ruin more gears than any other cause.

2. Do not try to cure wander, shimmy or road shock by tightening the steering gear.

Lubrication

3. Remove the pipe plug (1) and fill housing slowly with steering gear lubricant until it begins to run out of vent hole (8). If filled too rapidly the air cannot escape through (8) and the grease will be forced out of the gear at the top. Do not use ordinary grease (watch this particularly when having the car greased).

4. Use a heavy transmission grease of fibrous quality. It must possess cushioning as well as lubricating qualities but must not contain graphite in any form. Do not use a universal joint grease.



5. Replace the pipe plug.

6. Repeat every 5,000 miles. It may be necessary to do this oftener in some cases, especially if a rattle should appear or the gear feel draggy but do not wait till trouble forces you to do it. Lubricate at regular intervals.

Adjustments

7. There are only two adjustments. They are simple, quickly made, do not require special tools and stay put.

8. Disconnect drag link from steering gear (preferably by removing drag link rear ball socket in most cases). Follow the instruction book of the car maker in this as there are several special constructions in use.

9. If the jacket tube is held in the adjusting plug by means of a clamp bolt, loosen the bolt. If there is no clamp bolt, the tube is pressed into the plug and the dash bracket clamp must be loosened so that the tube will turn when the adjusting plug is turned.

10. Note: Always make adjustments A and B in the order given.

A. Adjust Thrust Bearings to Take Up End Play in Steering Wheel Tube

11. Back off the housing side cover screw several turns.

12. Back off lock nut (4) and lock screw (5).

13. Turn adjusting plug (6) until a slight drag is felt when turning the steering wheel, then back off plug (about 1/6 of a turn) till wheel turns freely but not enough to allow of any up and down movement of wheel tube.

14. Tighten lock screw (5) and lock nut (4). Turn wheel to make sure that adjustment has not changed.

B. Adjust Housing Side Cover to Take Up Lever Shaft Play In and Out

15. Since sharp turns are made only occasionally, it follows that more wear must take place toward the center; that is, when the wheels are nearly straight. Therefore an adjustment for wear is not possible unless some provision is made to compensate for the greater amount of wear toward the mid position (of the lever shaft with respect to the ends of the cam).

16. Adjustment is made possible by the taper on the stud of the lever and a corresponding taper of the sides of the groove in the cam. The greater wear toward the center is compensated for by making the width of the groove narrower toward the mid position.

17. It is evident that as the groove narrows, the stud, because of the tapered sides will ride higher—in other words it will move away from the center axis of the cam.

18. Therefore, adjustment for in and out movement (end play) of the lever shaft must be made at the narrowest part of the cam groove. The exact location of this narrow part is not important so long as it occurs within the ordinary driving range, (par. No. 15).

19. Remove all but two diagonally opposite housing side cover screws.

20. Turn the steering wheel as far as it will go in one direction. This brings the stud into a position where there is no danger of damaging the cam when

(*Please turn to page* 45)

BIG LOADS mean PAY LOADS when maintenance costs are lowered with Packard Ignition Cable

It doesn't take many schedule delays or repair lay-ups to eat away that close margin of profit in truck operation. Because profit depends on shaving maintenance costs right down to the minimum.

Super Duty Packard cable has proved its ability to perform on the most gruelling trucking jobs over a longer period of service efficiency. Small and large operators the country over install Packard for lower maintenance costs, fewer replacements and the assurance of "payload" operation.

When replacing cables specify Packard for super-duty service . . . Packard Electric Corporation, Warren, Ohio.

Packard

REG. U. S. PAT. OFF.
TRADE MARK

IGNITION CABLE • BATTERY CABLE • LIGHTING CABLE

The Standard Wiring Equipment of the Automotive Industry

Say "I saw it in FLEET OWNER"—It Helps!

TROUBLE SHOOTER

(You Ask 'Em — We Answer 'Em)

A department, devoted to correspondence from readers of FLEET OWNER. Any questions having to do with automotive service will be answered in this department. All properly signed inquiries will be replied to by mail and such of them as are believed to be of possible interest to other readers will be published in these columns.

Eliminating a High-Speed Shimmy

Question: We are having difficulty eliminating road tramp in a 1929 Chrysler 65. This trouble is somewhat similar to a shimmy, but seems chiefly confined to the steering wheel, which teeters about one inch either way at a speed of 45 to 55 m.p.h. The unusual thing is that this tramp will disappear at speeds in excess of 55 m.p.h. or fractionally less. Tires and shock absorbers are o.k. Some of the local experts have even advised changes in both caster and camber to avoid this difficulty, but such has not been attempted.—E. G. P., Boise, Idaho.

Answer: High speed shimmy is usually caused by the front wheels being out of balance, the springs being too flexible, or the shock absorbers not working properly. An expert in wheel alignment suggests the following routine in checking same:

First check the wheel balance on a wheel-balancing machine and balance the front wheels so that they are absolutely accurate. Check over both shock absorbers to see that they are functioning properly and have the desired tension.

If this does not overcome the difficulty, it may be necessary to stiffen the front springs. There is a tremendous action of wheels against the road at high speed, and the springs must be stiff enough to withstand same. It is often found necessary to re-arch the springs when they become sagged, or to add an extra leaf to give them the desired stability.

It is also recommended that you check all other wheel alignment angles; also the drag link. If the latter is out of line it may cause a quiver at high speed; this however is usually noticed at low speeds as well.

●

Test for Dragging Brakes

Question: Please tell us the best way in which to test for dragging brakes. We make brake adjustments and sometimes have comebacks from our drivers who claim that their brakes heat up after a few miles.—E. J., Seattle, Wash.

Answer: The old, time-honored method is to jack up the rear-end and the front end separately, and spin each wheel by hand. This does not take into consideration the fact that the wheel bearings might be worn, resulting in a different condition when the weight of the car rests on the axle shafts and bearings.

A better way would be to take the car out on a smooth, level road, run it up to a speed of 30 m.p.h., shift to neutral and let the car coast. When the speedometer drops to 25 m.p.h. begin to time the deceleration. At the end of exactly one minute the car should be rolling 5 m.p.h. or faster. If it stops before this, the brakes are too tight.

To offset the effects of any wind, it is well to make this test in both directions on the same level stretch. The average time taken for the car to decelerate from 25 to 5 m.p.h. should be not less than 60 seconds.

We believe this test will show up any tendency for the brakes to drag. If this test is made in cold weather, it would be well for you to run the car for a few miles before making the test, in order that the grease in the rear end is thoroughly warmed up.

●

Pinion Adjustment on Acme

Question: On a model 36 Acme truck, what is the correct way to adjust the rear axle pinion shaft for end play?—J. M. S., Haverstraw, N. Y.

Answer: The rule for adjusting roller bearings applies here, which is as follows: Be sure bearing cone and cup are free from grit and then tighten the adjusting nut to a point where the bearing begins to bind; then slacken the nut off from a quarter to a half-turn until the bearing turns freely. Then fasten it with the locking device.

On this particular truck, the pinion adjustment is made by removing a small cap or plate on the side of the housing and loosening the jam nut on pinion shaft and turning the adjusting nut to the right until the end play is taken out of the shaft. After making sure that it does not bind, set the jam nut up securely and the job is finished.

You May Not Believe It!

(But It's True)

THE FACT:

YOU can get more speed out of any standard, 5-passenger sedan by driving it backwards, or with the back of the body in the front. You will use less gasoline, too.

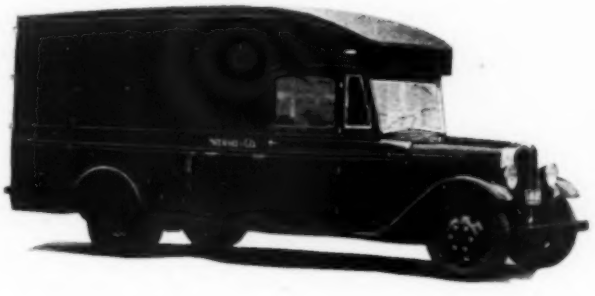
EXPLANATION:

CONTRARY to usual practice, a body with a blunt nose and a tapering stern, encounters about 20 per cent less wind resistance, than one with a fine, streamlined front. This was brought to the industry's attention late in November when Harry Hartz, famous auto racing driver demonstrated a standard sedan operating on this principle. All controls were reversed, of course, including the gears in the rear axle, so that when the car was in "high" it went backwards. In this particular case the sedan was just turned around, the driving being done by what normally would be the rear wheels, and the steering done by the front wheels, which trailed behind, together with engine, hood and radiator. Mr. Hartz's tests proved his theory regarding the lessened wind resistance, which naturally provides a higher top speed and a decreased fuel consumption.

3 New Bodies by HOPKINS

and all 3 with

PLYMETL



The three PLYMETL bodies illustrated here are representative of the fine "vocational" type bodies built by Hopkins, well known body builders of Hanover, Pa.

The large heavy duty trailer is especially designed for Dugan Brothers, who specify PLYMETL on all of their bodies. It is the largest body ever built for the express purpose of carrying bread. It has a capacity of 19,520 loaves of "whole wheat". The cab of the tractor is made of moulded PLYMETL. The trailer is completely paneled with PLYMETL including the moulded front.

The bodies built for Stewart & Company and the Knickerbocker Laundry, while not spectacular in size, are light weight, attractive jobs which can be depended on to perform their work with a minimum amount of servicing. PLYMETL stands up because it represents the finest quality obtainable.

PLYMETL's quality is recognized by an ever increasing number of fleet owners who specify it on their equipment.

PLYWOOD
HASKELITE
PLYMETL

HASKELITE MANUFACTURING CORPORATION
208 WEST WASHINGTON STREET, CHICAGO ILLINOIS.

Say "I saw it in FLEET OWNER"—It Helps!

TROUBLE SHOOTERS' DEPARTMENT (*Continued*)

No Toe-In on Rear Wheels

Question: We are working on a G. M. C. T19 truck, the wheels of which seem to be out of line, as we get poor tire mileage. We wish to state that we have serviced this truck continuously and have always checked up the equalization of the brakes, so that poorly adjusted brakes are not the cause of the extreme tire wear in this case.

Will you kindly tell us what the exact toe-in should be on both front and rear wheels, and oblige.—G. L. S., New York, N. Y.

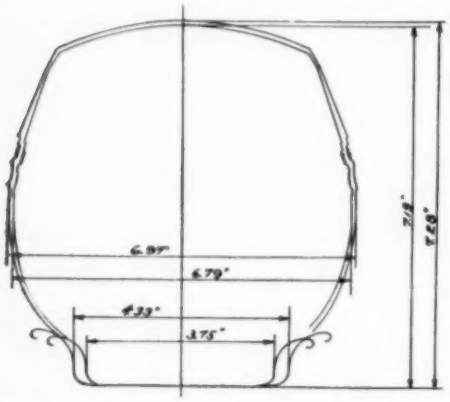
Answer: In the first place you should bear in mind that the rear wheels of this truck should not have any toe-in, but should be absolutely straight and true. The front wheels should toe-in ⅛ in., and the pitch of each should be ⅝ in. The king-pin should incline to about 9½ degrees from perpendicular.

You might check up on the rear wheels first and see that nothing is bent which would throw the rear wheels out of line. You might also check the front and rear wheel bearings for wear. Both of these factors might cause undue tire wear. We believe that by checking up on both front and rear axles and adjusting, replacing, or straightening, whichever the case may be, you will be able to overcome the difficulties mentioned.

●

Correct Size Rim Is Important

MANY truck tire failures have been traced directly to tires being used on improper sized rims. A test on a pair of 6-inch ten-ply tires was recently made by a leading tire manufacturer. One of the tires was mounted on a 5-inch rim and the other on a 6-inch rim. The test was conducted in the usual way, all conditions being equal except the rims on which the tires were mounted. After the test, the tire mounted on the smaller rim was broken on the shoulder because of the excessive flexing, and also broken above the rim flange. No signs of failure were noticed on the tire used on the 6-inch rim. The line drawing accompanying this item shows in detail the lack of rim support when a tire is mounted on an undersized rim, as well as the proper support when the tire is mounted on the right sized rim. Corresponding premature tire failures may also be expected in the larger sizes when used on undersized rims.



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About Oil Dilution Testers

Question: Please give us some information on an oil dilution tester; I believe the name is the ————; I do not know who makes it.—H. M. S., Rochester, N. Y.

Answer: According to one of a prominent oil company's engineers, oil dilution testers, several of which are already on the market, are not the most satisfactory thing from a standpoint of everyday utility.

Unless the same grade of oil is used at all times, unless the tests are made under the same identical conditions and at the same temperatures each time, these devices will not be practical, because of the fact that many variables enter into the crankcase oil situation.

Among the conditions to be met with are the different viscosity curves of the various oils, the different climatic conditions under which the oils are tested and also the different temperatures of the oil itself at the time of testing. Then too, the presence of foreign matter in the oil, such as water, gasoline, sulphuric acid, gum, and other substances would not be effectively indicated on such a tester. This is the advice of an oil engineer, and may be safely followed. We regret that we have no record of the manufacturer of the device you mention in your letter.

●

Two New S.A.E. Numbers for Oils

TWO new oils, designated as 20-W and 10-W, are being recommended by automotive manufacturers in their instruction books for the year 1934 and in current publicity. Refiners are planning to supply these oils for trial and use during the winter.

The ease of starting an automobile engine depends very largely upon the cranking speed which in turn is controlled by the viscosity or fluidity of the engine crankcase oil. All oils become more viscous and do not flow as readily at low temperatures as at high temperatures. If the oil becomes too thick or too high in viscosity at low tempertures, it will be difficult or impossible to start the engine.

S.A.E. 20 and S.A.E. 10 oils are classified in accord with their viscosity or fluidity at 130° F. This practice of classifying winter oils at summer temperatures has resulted in a wide variation, in the viscosity or fluidity of the commercial oils sold under these S.A.E. numbers, at the starting or cranking temperature.

In order to avoid the very wide differences in the temperature at which an engine can be started with oils of the same S.A.E. number, the new 20-W and 10-W oils are classified in accord with their viscosity or fluidity at 0° F., or in other words are classified in accord with their ability to permit easy starting within the temperature range for which they are recommended.

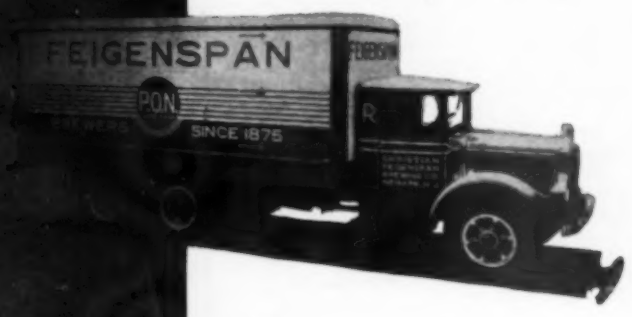
The classification for these two new oils is as follows:

	Viscosity at 0° F.	
S.A.E. No.	Maximum	Minimum
20-W	40,000	10,000
10-W	10,000	5,000

S.A.E. 30 oil is recommended as heretofore for use during the summer months and in territories where the minimum temperature does not fall below 32° F. The new 20-W oil is recommended for use in territories where the minimum temperature at which the engine is to be started will be below 32° F., but where the minimum temperature does not fall below 0° F. For territories where the minimum temperature at which the engine is to be started is below zero, but is not below 15° below zero, the new 10-W is recommended. For temperatures lower than 15° below zero 10-W should be diluted with 10% kerosene.

WEATHER UNDER PRESSURE ... *This Accelerated Weathering Machine determines resistance of a finish to heat, cold, water and wind. Painted panels are hung on racks inside the machine and exposed to intense ultra-violet rays and a brisk flow of circulated air. Then they are dropped into an ice-cold water bath. These changes occur at fifteen-minute intervals for several days.*

This truck carrying P.O.N. beer was finished in DULUX by Fitz Gibbon & Crisp for Roemer Bros. Trucking Co.



A YEAR'S WEATHER IN A FEW DAYS

Pre-Testing proves remarkable resistance of du Pont Automotive DULUX to the weather, and unusual retention of original appearance—BEFORE IT GOES ON YOUR TRUCKS

FIFTEEN MINUTES under heat... fifteen minutes under icy cold... fifteen minutes' exposure to wind... fifteen minutes under water. And this cycle repeated again... and again... and again!

What a test of paint durability! A few days inside this Weathering Machine equals a year's exposure to the outside weather. When du Pont Automotive DULUX Finish survives this test, it is thoroughly competent to give unusual protection to your trucks. This weathering test is only one of many du Pont chemists make to maintain the uniform high quality of Automotive DULUX and assure its fitness to serve on your trucks.

Tests prove that DULUX dries rapidly, keeps its gloss longer, resists abrasion, resists gasoline and oils, and above all keeps up appearances. DULUX is a Pre-Tested product that soon pays for itself in refinishing economy.

Your own refinishing shop or an Authorized du Pont Refinisher can apply Automotive DULUX easily with spray or brush. If you desire, we will gladly work out standard DULUX specifications for your whole fleet. We have already done this for many owners. Address E. I. du Pont de Nemours & Co., Inc., Dept F1, Finishes Division, Wilmington, Del.

DU PONT

AUTOMOTIVE DULUX

REG. U. S. PAT. OFF.

DU PONT MAKES A COMPLETE LINE OF AUTOMOTIVE REFINISHING MATERIALS

Say "I saw it in FLEET OWNER"—It Helps!

141. **Free Decelerometer.** Sounds almost too good to be true, doesn't it? But it's not a novelty and not a toy. They call it a Stop-O-Meter and it consists of a printed card with various brake performances graduated thereon. A pendulum, attached to the card, tells the story when the brakes are applied. All you have to do is hang it on the window of the cab and make your brake test. We understand that it operates on the same principle as the most costly of decelerometers, and it's free to fleet operators who will take the trouble to put Number 141 on our coupon below. (We anticipate that there'll be many requests for this, so first come, first served.—ED.).

•

142. **Text-Book on Body Building.** Over 50 pages of practical, helpful information about aluminum truck bodies—detailed construction drawings, 17" x 23", printed on paper from which blue-prints can be made—are included in this new book. It also contains operating and weight-saving data on aluminum bodies now in use, including dump bodies, vans, truck tanks, etc. Also detailed information on how to design and build such bodies to obtain low weight and long life. Need we say more? Number 142 brings it. The cost? Nothing but your good-will.

•

143. **Frank Talks on Anti-Freeze.** When reading a manufacturer's advertisement, which featured the above headline, we wondered who "Frank" was, and what was his last name. We've since learned, however, that it does not refer to any individual but means that the talks they've been giving you have been plain, unvarnished facts. If you want to "drop the rose-colored glasses" and get the latest facts about this new anti-freeze before your vehicles suffer from freeze-ups, just indicate your desire by including Number 143 on the coupon. They'll tell you why their anti-freeze will be a money-saver for you this winter. And you won't be obligated, either.

•

144. **Hands Off!** A good sign to have hanging around your own personal tool box, a freshly painted vehicle or your best girl. Now they say that you can adopt a "hands off" policy when charging batteries, inasmuch as you can charge them without touching them—without removing floor-boards—and without fussing with battery connections. Number 144 brings free literature covering new battery chargers that employ no bulbs and require no replacements and that are said to operate 7 to 9 years without renewals. It's now your move.

•

145. **One-two-three-four-five-six-seven-eight-nine-ten.** It's not sheep that we're counting, but ten new ways of getting more work out of your motor trucks. In fact, put quotations around it. and you'll have the name of an interesting booklet that gives the here's-how. The answer is by means of the modern truck time-clock, that enables each truck to keep its own record automatically. You can save truck time. prevent wasted time and get fair and square deals from your drivers by this method. Number 145 brings complete literature without obligation.

WHAT DO YOU READ?

HERE'S a hand-picked assortment of literature that is offered to you entirely without obligation.

We've even made it easy for you to get it. Fill in the coupon below, mail to the Editor, and let us do the work. We'll ask them to send it at once and not to bother you with salesmen, either.

146. **Are You Prepared?** With winter not right around the corner, but here, it would be well to anticipate radiator requirements. Not that we think you'll try to beat the anti-freeze people, and idle your motors, but it is possible that you may need new cores and need them in a hurry. A catalog covering replacement radiators won't take up much room in your file and we'll see that you get one without obligation. All you have to do is include Number 146 on your coupon.

•

147. **Transport Enamels.** A clever way of saying that this type of paint will look well on your trucks as well as on your buses, if you have any. The thing to remember is that this new type of finish has been developed especially for fleet use. All those qualities you've been looking for have been included, they tell us, and we're here simply to put you in touch with the manufacturer. Number 147 brings the complete story, sans cost, obligation or salesmen.

•

148. **Weld It or Rivet It?** You can do both to aluminum, and know that you are doing it properly, if you possess these two books on the subject. One is called "The Riveting of Aluminum." The other, "The Welding of Aluminum." All of the old bugaboos have been ironed out and you'll find these two books surprisingly free from high-hat, technical details and comprehensively to-the-point. Although they cost a pretty penny to produce, they're free for the asking. We think sufficient of them to include them in this department. You'll think as much of them when you get them, and, believe us, we've placed our copies where no one can walk off with them. Number 148 brings them, free, gratis or for nothing, if you will.

•

149. **What Does It Cost?** Figures on truck costs, although they usually do not mean a thing except to the particular operator concerned, are always interesting. We have a piece of literature that is *actually* the cost record of a successful transportation system. using 71 heavy-duty tractor-semi-trailer units. Almost 4,000,000 miles' experience are included in the report. If you would like to get it, and see how they operated at a total operating cost of .0592 per mile, Number 149 on our coupon below brings a free copy.

•

150. **Worth More Than It Costs.** That's what we think of this free sample. Everyone seems to be having plenty of grief with tire chains this winter. Now you can repair broken cross-chains without the use of tools, and your drivers can do it right out on the road. Number 150 brings absolutely free a sample set of the well-known "Monkey Links." They're self-closing. The set you will get contains an assortment of three different sizes of links. It should be mighty handy just now. As the supply is limited, first come first served.

The Editor, FLEET OWNER, ...1933
90 West St., New York, N. Y.

Kindly send me without obligation, the following free books mentioned in the.....issue. (Literature will not be sent unless firm name is given.) Order by number.

....

....

Firm Name .....

Address .....

City and State .....

Your Name .....Position .....

READER SAY-SO

(Picked at Random from The Editor's Mail-Bag)

Thanks, Mr. Moreland!

DEAR Mr. Fischer: May I take this opportunity to congratulate you on the high quality of editorial material which you assemble each month in FLEET OWNER." —*J. A. Moreland, Equipment Dept., Fifth Avenue Coach Company, New York City.*

●

You're Welcome, We're Sure!

"DEAR Mr. Fischer: Thank you for sending us FLEET OWNER—an excellent magazine, full of worth-while material. We operate a fleet of 35 buses and 2 passenger cars."—*R. B. Maxwell, Branch Manager, Peerless Stages, Inc., Oakland, Calif.*

●

Glad You Like It!

"YOUR publication FLEET OWNER is handed to me each month from our local office. Please have them addressed to me, personally, in the future, as I always find something very interesting in same."—*C. H. Sears, Garage Supt., Continental Baking Co., San Diego, Calif.*

●

Good for Bus Fleets, Too!

DEAR Mr. Fischer: "I receive the FLEET OWNER each month and must say that I get many good ideas from this publication. We operate a fleet of school buses."—*S. L. Johnson, Bus Foreman, Cresbard Consolidated Schools, Cresbard, S. Dak.*

●

Short and Sweet

"FLEET OWNER is O. K. and up-to-date. Thanks for continuing to send it to us. We operate a fleet of 36 trucks, 12 trailers and 7 passenger cars. After I finish reading FLEET OWNER it is passed on to my helper, who also reads it."—*Geo. J. Schweizer, Supt. of Maintenance, The Goyer Company, Greenville, Miss.*

"Best" Means "None Better"

"I LOOK forward to the receipt of the publication FLEET OWNER every month and by no means want the sending of this periodical discontinued. In fact, we think it is the best magazine of its kind printed. We operate a fleet of 13 vehicles and also do maintenance work for other departments once in a while."—*G. W. Brockman, Garage Foreman, Illinois Central R. R., Chicago, Ill.*

●

They All Read It

"AFTER reading your publication FLEET OWNER, same is turned over to our garage personnel for their perusal. We operate a fleet of 45 gasoline trucks."—*C. B. Hoppel, Supt. of Maintenance, Perfection Biscuit Co., Ft. Wayne, Ind.*

●

He Blows Our Horn

"FLEET OWNER is a very fine magazine with much helpful information in its pages. I appreciate getting it very much and look forward to it each month. We operate a fleet of 14 gasoline trucks and 25 passenger cars."—*Frank McDonald, Garage Supt., Globe Grain & Milling Co., San Francisco, Calif.*

●

They All Like It

"YOUR publication, FLEET OWNER, is greatly appreciated, not only by the writer, but by the employees of this station, as well."—*J. H. Ward, Jr., Union Oil Company, Turlock, Calif.*

"More Than Interesting"

DEAR Mr. Fischer: "I certainly do appreciate receiving FLEET OWNER. It is more than interesting and has some real good information in it. I pass it along to our automobile service station after I have read it."—*Percy F. Tindall, Traffic Mgr., John Simmons Co., 110 Centre St., New York City.*

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"Of Considerable Benefit"

"WE have received considerable benefit and information through your monthly magazine, FLEET OWNER. Our business is mostly car rentals and private bus work, and naturally FLEET OWNER has been a great help and we certainly welcome its arrival. We operate a fleet of 4 taxicabs, 4 passenger cars and 2 buses."—*Leon A. Peltier, Holyoke, Mass.*

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Wants Dope on Butane Gas

"HAVE you any information on Butane Gas, as a motor fuel? We are planning to use a certain set-up to burn this fuel but would like to be well posted on same before going ahead. Thanking you and assuring you that we read your publication FLEET OWNER carefully each month, and enjoy it, I am . . . "—*S. W. Buttles, Supt., Valley Motor Lines, Inc., Fresno, Calif., operating a fleet of 84 trucks and 44 trailers.*

(EDITOR'S NOTE: *According to our knowledge and to S. A. E. records, little, if anything has been done with Butane Gas as a motor fuel, in this country, although much in the way of experimentation has been done in Europe. If anything has been done in the United States it has been more-or-less private business and we haven't heard anything about it. We would be glad to hear from anyone who has had experience with this fuel.—H. C. F.*)

as WE GO to PRESS

(News of the Truck Industry)

THE American Trucking Associations, Inc., formally announced its permanent withdrawal as participant in the deliberations of the National Transportation Conference, effective December 7th. The reason given was that the representatives comprising this conference—chiefly those of the railroads—were deliberately flaunting the National Recovery Act in their recommendations, failing to consider the activities of the trucking organization in formulating a code. Representatives of the trucking organization had participated in the six meetings held by this Conference.

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THE Silver Fleet of The B. F. Goodrich Company has again been sent from Akron, Ohio, to its winter headquarters in Florida for its winter program of testing tires. Tires of all types and sizes will be tested by the fleet on the Florida highways, chosen by Goodrich engineers because of the excellent conditions which prevail there for this purpose during the winter. H. P. Viers will supervise the fleet, with 32 road foremen, drivers and mechanics.

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ELECTION of David C. Fenner as vice-president of Mack-International Motor Truck Corporation is announced. Mr. Fenner has been manager of the Corporation's Public Works Department for the last 14 years. He is chairman of the Motor Vehicle Conference Committee, member of the Legislative Committee of the National Automobile Chamber of Commerce, director of the N. Y. Motor Truck Association and vice-president and director of the Automobile Merchants' Association of N. Y. He has been prominent in public relations and legislative work for the automotive industry for many years.

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DESIGNED for garages and service stations where electric current is not available, and for repair cars offering tire inflation service on the road, a special gas-engine-driven air compressor outfit has been developed by The DeVilbiss Company, Toledo, Ohio. It is a ¾ h.p. outfit, having automatic control features unique in gas-engine-driven equipment. They'll be glad to send you details, of course. Fleet operators whose vehicles do not carry spares should find this of interest.

THE Ford Exposition of Progress which came to New York City from Detroit last month attracted such huge crowds during the two weeks of its scheduled running, that it was decided to reopen it for an indefinite period, immediately after Christmas. Besides the Ford educational and engineering exhibits, more than 150 other manufacturers were given the opportunity of helping to demonstrate how automobiles are manufactured. The huge crowds were attributed to the free admission and the unusual character of the exhibits.

•

STARTING January 3rd, in New York City at the Adirondack Log Cabin Building, 448 Lexington Ave., a series of shows is to be given in the principal cities of the East by the Brockway Motor Company. These shows will constitute a vivid presentation of specific modern distributive problems together with suggested solutions in the form of graphic charts, displays and brief explanatory talks. New 1934 Brockway truck models, both gas and electric, will be used to illustrate the present-day economics of truck transportation.

•

THE first full-streamline tank truck has been built by the Diamond T Motor Car Company of Chicago, to the special order of The Texas Company. Its revolutionary exterior design and the many unorthodox mechanical features of its chassis are the developments of H. W. Kizer, superintendent of automotive equipment for The Texas Company and C. A. Peirce, chief engineer of the Diamond T Company. Although the wheelbase is but 140 inches, it has a capacity of 1500 gallons. It follows torpedo shape, with blunt front end, cylindrical center section and gracefully tapering tail.

•

ANNOUNCEMENT is made in Cleveland by the Almetal Universal Joint Company of additions to their present factory which will give 50% more floor area. New machine tool equipment of the latest type has been ordered and this, together with the new building, will increase the output by 60%. One of the products that this Company will feature during 1934 is the new Almetal heavy-duty universal joint, especially designed for truck and bus use.

BY the time this issue is in your hands, the Automobile Show in New York City will have opened its doors and be in full swing. Of probably the greatest interest will be the new methods of front wheel suspension and the radical changes in streamlining of the bodies. The cars are expected to be somewhat enlarged in size. The truck exhibits, too, will command more than the usual interest this year, it is expected.

•

A NEW passenger car—the LaFayette—is announced by Nash. It is an L-head six-cylinder job on a wheelbase of 113 inches. Five body styles, in both standard and deluxe types will be offered, as follows: 4-door sedan, 2-passenger coupe, 4-passenger coupe, 5-passenger touring sedan and a 5-passenger 2-door sedan. The new car is Nash's entry in the low-price field and it will undoubtedly interest fleet operators.

•

THE Iowa State College, Ames, Iowa, has just issued a comprehensive 72-page book bearing the title "Statistics of Motor Truck Operation in Iowa." It contains tables of truck operating costs and many comprehensive charts covering gas and oil consumption, tire and other maintenance costs per mile, relation of age to trade-in value, curves for estimating the total life mileage of trucks, and other basic fundamentals. Copies may be obtained on application to the College. at the above address. The booklet is known as Bulletin No. 114.

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W. W. GILL has been appointed manager of the national accounts sales division of the truck and bus tire department of The B. F. Goodrich Company, according to a recent announcement. Mr. Gill succeeds the late C. H. Russell, and comes to his new post after four years as national accounts sales representative for Goodrich in New York City.

•

APPOINTMENT of A. Ross Jarman as service engineer is announced by Ray Day Piston Corporation of Detroit. He will specialize on the piston engineering problems of bus and truck operators, states J. C. Roper, Jr., sales manager. Mr. Jarman was formerly connected in an engineering capacity with The Champion Spark Plug Company and Defiance Spark Plugs, Inc.

for ROAD *and* SHOP

Makes Valve Guide Renewal Easy

FLEET executives attending the Automotive Service Industries Show in Chicago, accorded an enthusiastic reception to the new Toledo Valve Guide Tool, shown here. Introduced at the Show, this revolutionary tool makes the installation of valve guides a quick and simple operation.

The Toledo Valve Guide Tool is especially designed for putting in valve guides. It is not necessary to remove the cylinder block from the base, for by removing the engine head, this tool brings the new guides into place quickly and easily with a minimum of difficulty and delay. It is moderately priced, well within the means of every fleet garage and service station. Complete details can be secured upon application to The Toledo Steel Products Company, 3300 Summit Street, Toledo, Ohio.

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New Simmons Muffler Catalog

UP-TO-DATE with all the latest listings on shell type mufflers for all cars, trucks and buses, this new

Simmons catalog provides automotive fleet shops with handy reference information.

Whatever the car, you will quickly find the proper size muffler listed in this complete Simmons Catalog. A copy of this helpful book will be sent promptly on request to the Simmons Manufacturing Company, Cleveland, Ohio.

●

"BASA" Soft-Faced Hammer Announced

A NEW soft-faced hammer with replaceable and adjustable rawhide faces has just been introduced by Greene, Tweed & Co., 109 Duane St., New York City. It is said to overcome the objections to the ordinary rawhide mallet, and its name is the "BASA" Hammer.

In the Basa Hammer, an unassembled view of which is shown here, the adjustable metal head holds the rawhide faces firmly and the adjusting nut enables them to be permanently retained. The jaws are also recessed, so that the rawhide will slightly "mushroom" at the back, which further aids in holding them in the head securely.

The weight of each hammer has been worked out scientifically and care is used in the selection of the rawhide, to provide efficient workmanship and long-life operation. When the faces become worn, they can be replaced with refills at small cost.

Five different sizes of the Basa Hammer are available, from 1¼ to 5 lbs. in weight. These will be found of great value and can be put to many uses in the fleet shop—in fact every shop should have one or more soft-faced hammers for fender and body work, tire jobs, light assembling operations and service work in general. An interesting circular and list prices can be had without obligation. Write to Greene, Tweed & Co., 109 Duane St., New York City.

●

Rzeppa Universal Joints

A NEW type of universal joint has been developed by The Gear Grinding Machine Company, Detroit, Mich., which is claimed to overcome most of the common difficulties heretofore experienced with this member.

It is built on a mechanical principle quite different from the Cardan or pin joints. There are three main elements—two driving members and a close-fitting ball cage, having special contact surfaces. Assembled into a concentric arrangement, they form a self-contained unit. Six balls inserted into corresponding half-grooves of the driving members and a simple piloting device complete the joint.

All joint parts are made of case-hardened steel, with working surfaces ground to a precision equivalent to best ball bearing practice. No tools are required for assembling the parts, which position each other securely by interlocking.

The manufacture of this type of joint, of course, calls for precision workmanship, as the close-fitting parts could be machined and ground only by a workman accustomed to working to close limits. This "ball within a ball" type of construction is claimed to insure retention of oil for

at least 5,000 miles of high speed, and tests indicate a mileage of well over 100,000, as units inspected after 45,000 actual miles on the road show no wear whatever, the makers state. The booklet illustrated here will be sent free on request. Write to Gear Grinding Machine Co., 3707 Christopher St., Detroit, Mich.

NEW STUFF *for* ROAD *and* SHOP *(Continued)*

You'll Want This Free Book

IT'S one of the papers read before the S. A. E. Chicago Congress last Summer, but don't imagine it's full of engineering technicalities, for it's not.

Briefly, it represents the complete record of a fleet operator's two-million mile road experience with relation to piston rings. A large public utility concern made the installations in its own shops (just as you and I) and then operated the vehicles in its regular service.

This interesting fleet information was first delivered before the S. A. E. in Chicago. Now it's available in printed form, as shown here. And it's free for the asking. Write to Wilkening Mfg. Co., Philadelphia, Pa., for your copy. There'll be less delay if you mention FLEET OWNER.

●

"Runwel" Automotive Packings

"AN asbestos packing into each strand of which graphite grease lubricant has been forced hot under pressure before the strands are braided or twisted up into final shape." That is the way the manufacturer of "Runwel" automotive packings describes his product, used for many years in the automotive and industrial fields.

These packings are made in square braided form, or in twisted form. The square braided type is available in any size needed for automotive work, while the twisted type is made in sizes from 1/16 to ½-inch in diameter.

The friction caused by hard, unlubricated packings will cause an unnecessary amount of power waste, will necessitate frequent and expensive repackings and will do untold damage to shafts and journals. Runwel packings are claimed to overcome these disadvantages. Write to Greene, Tweed & Co., 109 Duane St., New York City, for further details and fleet discounts. Mention of FLEET OWNER will be appreciated.

●

Little Giant Brake Tester

THIS is a portable brake tester that will fit and give proper recording of brake performance of any vehicle, whether it have single or dual tires and whether it is a small passenger car or a big truck or bus, according to the makers.

Each wheel is tested individually and an actual reading is recorded on the record card, as shown in the illustration. Since a supply of these cards is furnished with each tester, it would appear that brake record-keeping can be somewhat simplified with this device.

Brake resistance is recorded, after brake pedal is locked in depressed position, by means of a set of planetary gears, through which the resistance is measured. For further particulars concerning this interesting device, write directly to Little Giant Products, Inc., 1530 N. Adams St., Peoria, Ill., mentioning this publication if you please.

●

"Auto-Motive-Air" Brakes

THE Wagner-Electric Corporation, 6480 Plymouth Ave., St. Louis, Mo., recently announced to the trade that Auto-Motive-Air power actuation equipment for truck, trailer and bus brakes will be installed and serviced nationally thru its chain of factory service branches.

Auto-Motive-Air is claimed to be a radical departure from present types of power actuating equipment. A compressor, capable of high efficiency, operated by the waste power in the intake manifold, compresses and stores air in a reserve tank.

A new type of control valve which is claimed to be the latest and most up-to-date graduating unit of its kind, assures smooth fast stops.

Power cylinders similar in design to those used on some rail equipment actuate the braking mechanism. Perfect equalization, full control, moderate cost, and low upkeep are the claims made by the manufacturers. Details sent free on request.

●

New Weed Emergency Unit

A NEW Emergency Unit Chain has been announced by American Chain Company, Inc., Bridgeport, Conn., makers of Weed Tire Chains.

Each unit has two bar-reinforced cross-chains attached to galvanized side-plates which are heavy enough to stand the wear and tear to which this kind of device is subjected. The cross chains are made of Weedalloy, the same metal used in Weed tire chains. Balanced construction helps to keep the chain in proper position on the tire.

The compact double-locking buckle is easy to operate, yet holds the chain in a snug fit and prevents it from becoming loose in use. Cross-chains are brass plated; side plates are gray galvanized. Distribution to the trade is being made through regular Weed distributors.

●

New Pipe Cutting Outfit

ANOTHER new cutting machine has been announced by The Linde Air Products Company, 30 East 42nd Street, New York, as an addition to its line of apparatus, known as the Oxweld Pipe-Cutting and Beveling Machine. It consists of a center rod with three spreading arms which press against the inner wall of the pipe, holding it in position, with an arm supporting a blowpipe that can be adjusted to the desired angle of the cut. The blowpipe and arm rotate without the use of a crank for quick centering of the device, and by means of a crank when doing actual cutting.

This machine will take almost any hand-cutting blowpipe, is readily portable, and its operation is extremely simple. Once centered in the pipe, the operator merely turns the crank, causing the blowpipe to rotate evenly around the pipe, making a clean machine-like cut. Whenever large quantities of pipe are to be cut and beveled, this machine will save time, money and trouble.

NEW STUFF *for* ROAD *and* SHOP (*Continued*)

Improvements in Eye Protection

THE latest advances in eye protection for oxy-acetylene welding and cutting have been embodied in the new Oxweld No. 15 welding spectacles and a new lens, Type AA, just announced by The Linde Air Products Company, 30 East 42nd Street, New York, N. Y.

In this new type spectacle the lenses are mounted in a natural canvas-bakelite frame and are 50 mm. in diameter. This width permits a wider angle of vision and gives greater protection against light and sparks.

The temples (bows) are covered with insulating material, and the frame is non-flammable and does not conduct heat. By means of a snap device where the temples meet the frame it is possible to spread the frame and change lenses in a few seconds. Lenses can be furnished in the same colors and shades as for other goggles.

The use of the Type AA lens is recommended where safety codes prevent the use of other lenses which are not flat-ground and polished, although equally effective otherwise. This new lens conforms to all code requirements, including those of the Federal Government.

●

Perfect Circle Ring Tool

PISTON rings may now be mechanically installed on a piston by the use of the Perfect Circle Ring Tool, thus eliminating the possibility

of ring fracture and distortion. This new ring tool does this job by expanding the ring into a metal collar thereby preventing the ring from being sprung out of shape.

The efficient performance of piston rings depends largely on their correct shape, which is built in during the manufacturing process. If a ring is distorted while being sprung over the head of a piston, the efficiency of the ring will be greatly reduced.

This new ring tool is now available in the most popular cylinder diameters with other models to be announced soon. An attractive wooden case, holding 10 tools is now available to purchasers of 5 or more sizes. For complete details write to The Perfect Circle Co., Hagerstown, Ind., mentioning FLEET OWNER, please.

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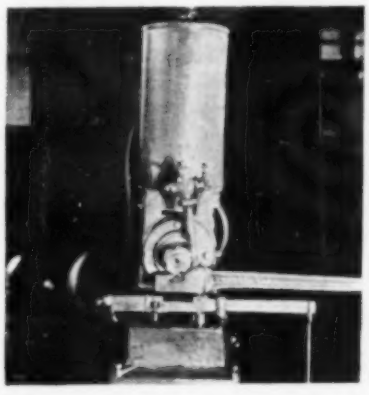
Machine for Testing Lubricants

THE Timken Roller Bearing Company, of Canton, Ohio, has developed a machine which will accurately determine the load carrying capacity of lubricants. Essentially, this machine consists of a cast iron base supporting a testing mandrel, a tank containing the lubricant, and a lever system for applying load or friction. Three General Electric cartridge type heating units keep the lubricant at any desired temperature from ambient of to 210 degrees Fahrenheit. The equipment is simple in design



and is so easily operated that the operator needs no special training or particular skill to obtain accurate results.

The machine answers some very pertinent questions which heretofore have been difficult to solve. It is designed to test the load carrying capacity or film strength of lubricants, particularly those beyond the range of viscous lubrication and is, therefore, adapted to testing "extreme pressure" lubricants. Tests can be made to show accurately comparative load carrying capacity of lubricants at constant rubbing speeds and the maximum load a lubricant will stand before the film breaks down. These tests can be made with reference to any typical operating condition such as load, speed, or temperature.

The testing machine, although primarily designed for checking the load carrying capacity and friction of lubricants, has been modified to check the wear developed by any abrasiveness in the lubricant under investigation. Certain types of compounded lubricants have been found to be quite abrasive, and the amount of wear taking place during a test can be easily checked by weighing the specimen before and after the test to determine the amount of material that has been removed.

The determination of friction depends upon load, rubbing speed, materials in contact, temperature, and the lubricant. Changing any one of these factors may change the friction. The testing machine, with its lever system which includes a friction arm, a Vernier scale, and a sliding weight for obtaining accurate measurement, makes it possible to read friction accurately at the test surfaces.

●

And Now, Toledo Valve Guides

THE Toledo Steel Products Company, manufacturers of Toledo valves, chassis bolts and bushings and water pump parts, announce a new line of Toledo valve guides. Toledo engineers have been experimenting with valve guides for many months and the exhaustive tests conducted by the company prove that in order to obtain the greatest efficiency possible in the modern, high-speed, high-compression motors new valve guides should be installed when valves are replaced.

Toledo valve guides are of quality construction in every detail. First, they are cored, insuring iron of highest quality on the inner working surface of the guide, as well as on the outer surface; then reamed to size; and finally burnished for extra smoothness and increased wearing surface. They are made from a special iron alloy, consisting of finest iron and chrome and nickel alloys. This results in a very dense, close grained structure and gives the greatest resistance against wear.

Complete details and a catalog on the new Toledo valve guides can be secured on application to The Toledo Steel Products Company, Toledo, Ohio.

●

Emergency Chain For Trucks

A NEW emergency chain for pneumatic truck and bus tires, combining strength and ease of fastening, has been announced by the Pyrene Manufacturing Company, Newark, N. J.

The chain is all-steel with hardened twisted-link cross chain and straight-welded link chain for the side members. It may be fastened to spoke or ventilated disc wheels by simply placing the chain around the tire and hooking a link into the snap hook.

This hook has no projections to catch on anything. It can be easily opened by hand but it cannot open when in motion.

It is recommended that three or four chains be used on each wheel—not as a substitute for regular tire chains but for emergency use only. The Pyrene Emergency Truck Chain is being sold through jobbers and dealers throughout the country.

QUESTION *of the* MONTH

"By far, one of the most valuable departments to be found in any automotive publication. Every fleet man should be delighted to cooperate."—A Reader

Here are Some of the Most Interesting Replies to Question No. 38:

General Utility Jack Finds Many Uses

"FOR lubrication we use a lift; hoists and jacks to raise the trucks for repairs, using horses under them as a matter of safety. We prefer the hydraulic type of lift. Ours is of the free-wheel type. We also have 5 garage jacks and 1 dolly jack, both of which are mechanically operated. Our 12 horses are of the home-made type. We have 4 chain hoists on tracks.

"We also have a general utility jack with a 44-inch standard. This is used for lifting, straightening frames and other work around the garage. Bodies are removed by an overhead chain hoist with cradles.

"All of our vehicles are equipped with suitable jacks while on the road. We think that better work can be done in the shop, over jacks and horses, as we are now doing it. We prefer hydraulic jacks for general use."—*A. V. Nidy, Garage Supt., People's Outfitting Co., 150 Michigan Ave., Detroit, Mich., operating a fleet of 23 trucks, 6 trailers, 11 passenger cars and 7 other vehicles.*

●

Prefers Pits with Cross Beams

"IN reply to your Questionnaire No. 38, I wish to inform you that we use the following equipment: Screw jacks, mechanical jacks, one dolly jack and an overhead portable chain fall (2-ton). This equipment seems to cover our needs very well, although pits that are well constructed and free from fire hazards, with large exits, are mighty handy, especially pits designed with sliding I-beam cross sills and channel runways.

"I really prefer the above to our modern lifts, as it is very handy to use jacks, etc., in connection with heavy work. And as far as adjustable horses, mechanical, screw and hydraulic jacks are concerned, you will run across jobs that will prove each one to have some advantage over the other. The portable chain fall is also a fine guard against danger and accidents, if properly used. Bodies are removed with an overhead hoist. All of our vehicles are equipped with a suitable jack while on the road."—*R. H. Fassett, Supt. Garage, El Paso Laundry, El Paso, Texas, operating a fleet of 21 trucks and 8 passenger cars.*

●

Wheel Jacks Fast, Safe and Durable

"HORSES, jacks and hoists make up our elevating equipment. We find wheel jacks to be fast, safe and durable, where hoists are not available. When using hoist, we always use jacks or horses, for safety and economy. We prefer the hoist for lifting jobs.

"We have 12 hand jacks, 8 dolly jacks, 4 other jacks, 12 horses, 4 hoists and one winch on our wrecker. This equipment enables us to handle our work o. k. and we believe that the best work can be done on jacks and horses.

"Each of our vehicles is equipped with a suitable jack while on the road. We prefer hydraulic jacks. We have no trouble in hoisting objects but the blocking problem is tough; keeping sufficient on hand."—*Gordon Eddy, Garage Supt., Detroit Creamery Co., Detroit, Mich., operating a fleet of 372 trucks, 42 passenger cars and 62 other vehicles.*

●

"Lifts Speed Up Work About 30%"

"WE have used pits for brake, bearing and rear-end work, and now have two single-cylinder hydraulic lifts. All work that is done on these lifts is speeded up by about 30 per cent. We do not consider lifts dangerous and have had no mechanical trouble since they were installed in our garage three years ago. When smaller wheel diameters came into style, our hydraulic jacks were too high and had to be replaced with mechanical lift jacks.

"We prefer the free-wheel type of lift and have four additional mechanical jacks, but no horses. One chain hoist in our shop is used for removing bodies when necessary. All cars are equipped with suitable jacks while on the road. We prefer the mechanical type of jack, but the hydraulic type of lift."—*M. S. Crossley, Supt., Police Department, City of Seattle, Wash., operating a fleet of 54 passenger cars, 3 trucks and 33 motorcycles.*

●

Pit for Lubrication; Lift for Brake Jobs

"LIFTS, pits, jacks, horses and hoists are used for our lubrication and repair work. We use the pits for lubrication and inspection and the lifts for brake jobs. A large 7-ton dolly jack is used for raising and shifting miscellaneous jobs. Horses are used for holding the jobs in a safe position. We believe that

What Piston to Use?

NOT an easy question to answer, by any means. But by exchanging experiences with the other fellow, through the medium of the blank printed on the opposite page, we guarantee that you'll get some idea as to the relative performance of different types of pistons in various kinds of automotive equipment. If you fill in the blank and mail it to me, I'll send you a tabulated report of all the answers received. Otherwise you'll have to be satisfied with the few answers that we print on these pages.—*H. Clay Fischer, Editor.*

HOW WE RAISE 'EM *for* REPAIRS (*Continued*)

each type of the above equipment has its place. The lifts are of the free-wheel type. We also have six garage jacks and 6 stationary jacks, or horses, the latter of the manufactured type. Two overhead hoists round out our lifting equipment.

"All of our vehicles are equipped with suitable jacks while on the road. We prefer the hydraulic type of jack. Good repairs can be made on various types of equipment by all of the above methods."—*N. W. Glass, Supt. Automotive Equipment, Indiana Service Corporation, Ft. Wayne, Ind., operating a fleet of 66 trucks, 4 buses and 13 trailers.*

●

Half-Pit with I-Beam Tracks O. K.

"JACKS and horses are used for our elevating work. We raise one end of the vehicle at a time and set it on specially built wooden horses. However, we prefer the half-pit, built half above and half below the ground.

"Our elevating equipment consists of 2 garage jacks, 2 dolly jacks, 4 horses and 1 portable overhead hoist. Bodies are removed with the hoist. All of our equipment is equipped with suitable jacks while on the road. We prefer hydraulic jacks. It is our opinion that better work can be done in pits of the type described above."—*R. O. West, Shop Foreman, Yellow Cab & Baggage Co., Topeka, Kansas, operating a fleet of 12 trucks, 1 bus and 19 taxicabs.*

●

Revamped Street-Car Pits Have Faults

"REVAMPED street-car pits are used for our lubrication and repair work. One disadvantage is that it is difficult to jack the buses up for repairs when they are over the pits. We much prefer lifts. We have one hydraulic dolly jack and one metal rack or stand. Other jacks include 12 street-car jacks and three garage jacks.

"We also have six horses of the manufactured type and two overhead chain hoists. Each vehicle is equipped with a suitable jack while on the road. We prefer hydraulic jacks, and believe that better work can be done over lifts and pits than on jacks or horses. Bodies are removed by an overhead chain hoist."—*J. W. Dilree, Shop Foreman, Lewistown Transportation Co., Lewistown, Pa., operating a fleet of 20 buses and 1 passenger car.*

(Please tear out and mail to The Editor, The Fleet Owner, 90 West St., New York City)

Question No. 40—Pistons

What type of piston do you prefer (iron or aluminum) for passenger cars? .....
For light trucks?..... For heavy-duty trucks?..... For bus work?.....
Do you replace iron pistons with aluminum in any of the above vehicles? .....
If so, in what types of vehicles?.....
Do you replace regular iron pistons with special lightweight iron pistons?.....
If so, in what types of vehicles?.....
What make (or makes) of piston do you prefer for general replacement work?.....
What is your opinion as to the relative wearing qualities of iron versus aluminum alloy pistons for passenger cars and light fast trucks?.....
What is your opinion as to the relative wearing qualities of iron versus aluminum alloy pistons for heavy-duty truck or bus work?.....
What is the average yearly mileage (per vehicle) of the passenger cars in your fleet?.....
Of the light trucks?..... Heavy-duty trucks?..... Buses?.....
What is the average life of iron pistons in the passenger cars in your fleet?.....
In the light trucks?..... Heavy-duty trucks?..... Buses?.....
What is the average life of aluminum pistons in the passenger cars in your fleet?.....
In the light trucks?..... Heavy-duty trucks?..... Buses?.....
What has been your chief difficulty with pistons in 1933? (Please explain) .....
.....
What has been your experience with piston expanders? (Please explain) .....
.....
What is your source of supply on replacement pistons? (Please check below)
☐ Jobber ☐ Vehicle Dealer ☐ Vehicle Mfr. ☐ Piston Mfr. Others .....
Remarks .....
.....
We operate.....Trucks; .....Buses; .....Pass. Cars; .....Other Vehicles

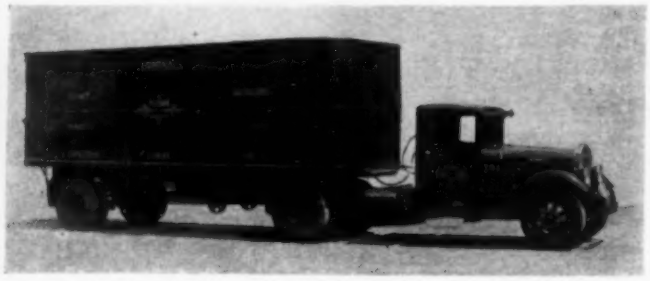
Note: If you cooperate with us and fill out this questionnaire, you will be entitled to a tabulated report covering all of the answers.

Swap your Maintenance experience with other fleet operators in this easy, convenient way. We do the work. You get the benefit.

Name of Firm .....
Address .....
City and State .....
Your name .....*Position*.....

Metal-Faced Plywood Facilitates Bending

THE unit shown here is but one of thirty large transport bodies recently delivered to the Moran Transportation Lines in Buffalo, N. Y. They were built by the E. A. Cook Body Corporation of that city, and are constructed throughout of Armorply metal-covered plywood.



An important feature of the design of this equipment is that the curved fronts are made of flexible Armorply, which is so constructed that when the wood back portion of the panel is wetted, the panel will bend readily to the required radius.

●

New Ideas Regarding Motor Oils

OLD ideas that gravity, fire, and flash point were of importance in judging good motor oils have been cast aside and in their place is definite knowledge that satisfactory cold weather service depends largely on three things:

(1) Proper viscosity or body, neither too thick or too thin;

(2) As little change in body as possible with changes of temperature;

(3) Free pouring at low temperatures in winter.

This is the view expressed recently in a Science Service radio address by Dr. Robert E. Wilson, vice-president in charge of research and development, Standard Oil Company of Indiana.

The tendency to use heavier oils than officially recommended is condemned by Dr. Wilson. Any small saving it may effect in consumption cost is more than offset by greater starting difficulties and waste of gasoline due to higher friction loss in the engine, he declares.

"The oil which thickens up the least at low temperatures or thins out the least at high temperatures is the one best adapted to operating over a wide range as in an automobile engine," Dr. Wilson is quoted as saying.

"Oils of paraffin base or mixed base are likely to contain a sort of jelly at low temperatures. This jelly has practically nothing to do with ease of starting, but it does interfere with the feed of the oil through the oil screen and to the oil pump. If an engine is started at a temperature below the pour-point there is likely to be an interval before the oil reaches the bearings and cylinder walls. During such a period serious admage is likely to take place.

"For year-round driving the factors of major importance are, first, tendency of the oil to oxidize and form sludge, and, second, its tendency to deposit carbon in the engine.

"Recently it has been found possible by improved refining to produce oil which can be run almost indefinitely without any tendency to develop sludge. With such oils, draining is necessary only to take care of outside contamination or seasonal change.

"The most important factor in determining the amount of carbon deposited by a given oil is its volatility. An oil which distills readily from a very hot surface is better than one which stays behind and is decomposed by the excessive heat to form carbon."

●

Another New UPS Package Car

A PACKAGE delivery car especially suited to localities where small vehicles are more practical, has been designed by the United Parcel Service and will be put into experimental use soon. Until now this company has used the standard half-ton Ford chassis for its small-body vehicles, but comparing the operating costs of the half-ton and the ton-and-a-half chasis, it was believed that greater economy might result by using the larger chassis, cutting it down from 131½ inch to 112 inch wheelbase. This would provide a sturdier car with heavier axles, heavier transmission and greater braking power and yet would not be too large for the body required.

Upon this sturdier chassis will be mounted the newly designed half-ton package body which the company recently adopted after long experimentation to find the type of body best adapted to its need. This body has 180 cubic feet capacity. Its loading space is 6 feet long by 68 inches wide and 64 inches high. A well 21 inches in length, 15 inches deep and extending across the full width of the body enables the driver to stand full height in the rear of the body when loading. The low step afforded makes it very easy for the operator to step into the rear of the body from the street when he wishes to arrange his load or remove a piece of bulky merchandise. The well is also useful as a place in which to load tall fragile pieces such as lamp standards.

●

Custom-Built Trailer for Brooklyn Baker

THIS trailer, said to be the largest of its kind, was especially designed and built by Hopkins Mfg. Company, body builders of Hanover, Pa. It is operated by Dugan Brothers, the big Brooklyn bakers.

The trailer is completely paneled in Plymetl and has a rounded front of the same material. The cab is also made of moulded Plymetl.

The carrying capacity of the trailer is 19,520 loaves of "whole wheat" bread.

●

Attention Manufacturers! (Advertisement)

ANY manufacturer desiring 100% coverage of the State of Maryland will do well to communicate with me. I am now handling a line containing only three units, priced at $300, $700 and $1,000 respectively and must, therefore, waste a certain percentage of my interviews.

I publish my own house-organ monthly and follow up both by telephone and personal calls. I want a line with repeat build-up and units involving less money. If you have the right line I can do a good job. References furnished. You can reach me through Box 217, care FLEET OWNER, 90 West St., New York City.

Keeping Track of Brake Applications

(*Continued from page* 14)

runs, showing the various running and idle times, the frequency of brake applications, and the relation of brake applications to delivery stops. A careful study of these will indicate the thoroughness with which we are able to keep checks on our drivers' individual habits, and will also reveal the different tendencies among drivers that we otherwise could not observe.

One of the things which we must take into consideration is the fact that the routes covered differ widely, as to traffic congestion, stop-lights, hills, etc., so that we are able to guide ourselves accordingly before taking a driver to task because his brake applications might seem to be too high, in relation to his number of daily deliveries.

Experiments with the aforementioned instruments have been in progress for about 15 months, during which time much valuable data have been collected. While no definite conclusions have been reached, the following facts have been established:

1.—*Two different men operating the same vehicle on the same route will vary as much as 50% in the use of brakes.*

2.—*Brake applications to the extent of 1,475 in a distance of 115 miles have been recorded.*

3.—*Operators have greatly improved in the use of their brakes since these instruments have been put into service, resulting in longer brake lining life, and fewer complaints about their brakes.*

4.—*Indications are that brakes are used to a greater extent towards the end of day's work than in the beginning of the day, probably due to greater caution being used in driving, probably as a result of mental fatigue in the driver; therefore not taking those chances as he would earlier in the day when his mind and vitality were in better shape.*

5.—*Number of road accidents has been materially reduced, because operators are more "brake-conscious," and because the record on the Servis-Recorder charts would plainly indicate the time of the accident, and whether or not the brakes were used at the time of the accident.*

It has been noted that some drivers very frequently use their brakes on the open highways, while running at most any speed for the purpose of slowing down at intersections and in advance of making turns. This, of course, is done at a great sacrifice in fuel but does not necessarily reflect inefficiency in performance, since the time gained thereby usually more than offsets the additional cost of the extra fuel.

However, like all other operating evils, unless brake applications are skilfully executed at all times, tire mileage is greatly reduced because of excessive wear due to the frequency of too high a rate of deceleration.

There shall be considerable and valuable data result after the compilation of records and information collected within a year, and with a further study of these facts, some constructive plans shall be made for educating drivers in the proper and most efficient use of brakes. Also we shall be enabled to better discriminate in the matter of the selection of the proper types of lining we should apply to the different types of vehicles and according to the conditions experienced in operation.

We are convinced that there are fewer poor linings and more good linings made than given credit for by users and operators. The fault does not belong to the manufacturers of brake linings to the extent commonly believed, but rests to a much greater extent with the operator and fleet owner.

The
BASA
Rawhide-Faced Hammer
for **QUICK REPAIRS TO MOTOR CARS, TRUCKS AND BUSES**

A soft-faced Hammer is required, having the proper weight and balance that will not injure the surface struck.

Hammer with nut loosened for removing faces.

The BASA Hammers are especially designed for Fleet Work, and are more economical than rawhide mallets, as the rawhide faces, when worn, can be replaced at small expense.

Faces cannot shrink and become loose in hammer, as the jaws of head are screwed up firmly against faces, which mushroom at the back when struck, conforming with recess in jaw.

Hammer ready for use.

BASA faces can be depended upon for uniform quality and endurance.

BASA Hammers are made in five different sizes. Send for full particulars.

GREENE, TWEED & CO.
Sole Manufacturers
109 Duane St., New York

The Brockway Transportation Survey

IN order to encompass the entire requirements of all classes of operators, the Brockway Motor Company has conducted a series of surveys with intensive research work, covering a large number of various types of trucking operations.

This research work was conducted by men of international reputation as transportation authorities.

The study disclosed that there are many factors beyond the control of the truck manufacturer, or even the individual operator himself, such as traffic conditions, legal restrictions, questions of taxes, insurance, etc. It was felt that these factors could be best handled by the Motor Truck Associations.

There were, however, many other factors which would increase the value of the motor vehicle equipment to the owner. Among these were,—proper loading and unloading facilities; selection of the correct truck for the type of goods to be transported, with especial reference to body design; the designing of the entire job to get the maximum loads permissible by the various state laws; the education of drivers by the establishment of a definite code not only to permit them to increase their daily mileage but also to foster the good-will of other users of the highways; and the readjustment of routes and schedules to permit the proper use of the faster, more flexible motor truck of today.

The survey disclosed that throughout the country in general—considering trucks of greater than 1½ ton capacity and eliminating passenger car chassis used for truck purposes—more than 27%, and in the industrial centers more than 40%, of the trucks in use were obsolete. They were out-moded and not fitted for present-day operating conditions.

In fleet after fleet, analysis showed that the work performed by six trucks could have been done by four; the work of thirteen or fourteen by eight. And in many cases, if the trucks used were designed to take full advantage of present-day laws, the work performed by ten trucks could have been done by four. For example, many states permit considerably larger loads on pneumatic tires than on solids. In New York, to cite one instance, there is a differential of 20% on the gross capacity, with a consideramly greater advantage gained on the payload. Consequently, where maximum gross loads are carried, four pneumatic-tired trucks can always do the work of at least five with solid tires.

In every branch of industry, the success of automotive truck engineers over these past few years is evidenced by a reduction in the number of trucks required to provide the same ton-mile capacity as formerly, or by an increased ton-mile capacity with no increase in number of trucks. Every operator, by comparing his present truck equipment and ton-mile capacity with those of five or ten years ago, can judge to what extent he has availed himself of the truck engineering advances at his command.

●

How Most Traffic Accidents Happen

"The principal causes of accidents, based on investigation are: fatigue of driver; poor judgment of speed in regard to feet to stop; cars parked in narrow street and pulling out without looking; operators' vision on trucks obstructed; hitching on one car and falling in the path of another; starting before the green light appears; turning left on a green light, thereby striking persons crossing the walk; listening to radio (mind not on driving); eight foot law between cars not observed."

New Addition to Carter Carburetor Plant

TO provide ample facilities and meet the increased demand for Carter Carbureters occasioned by the adoption of this popular unit by several car manufacturers, the Carter Carburetor Corporation is rapidly pushing to completion a large addition to their modern factory at 2834-46 North Spring Avenue, St. Louis, Mo.

More than half of the passenger cars and trucks produced in 1933 were equipped with carbureters designed or manufactured by Carter, a recent factory bulletin states.

●

A New Driver Control System

AS a further step in its campaign to prevent accidents, the United Parcel Service, a consolidated delivery organization serving retail dry goods stores in eight Pacific Coast cities and in New York, has recently put a unique driver control plan into effect. After carefully studying the accident record of each one of its several hundred drivers, the entire personnel has been classified and qualified as to driving ability and given a rating which is indicated by the number of his uniform badge.

For example, badge numbers between 1 and 300 are issued only to drivers who are qualified to drive furniture, line-haul and large pick-up cars, as well as smaller vehicles.

Badge numbers between 301 and 1000 are issued to drivers qualified to drive package cars; and numbers above 1000 are issued only to helpers and others who are not qualified to drive any type of car. No helper who has been assigned to a badge number over 1000 is permitted to drive a car by himself. If he has a chauffeur's license, he may drive under the supervision of his driver and only while the driver is with him in the car. He is not permitted to drive or even move the car in the absence of his driver.

Any helper or driver who wants to qualify for a lower badge number may do so by applying to the Personnel Department for a road test. No driver or helper, under any circumstances, is permitted to drive a car other than the type of vehicle indicated by his badge number.

Delivery volume fluctuates considerably due to seasonal conditions or special sales and it frequently becomes necessary to send drivers and helpers to the various sub-stations, on short notice. The badge numbering control arrangement enables the sub-station manager to determine definitely the driving qualifications of each man sent him and to assign the man accordingly. Properly qualified drivers for the various types of cars are thus always assured.

Effecting Economies in the Fleet

(*Continued from page* 16)

my belief that each vehicle must be considered separately to account for differences in usage, wear and tear, etc.

Aside from cost of operation which of course is a basic determinant, we must consider obsolescence which can be due to the age of the vehicle, changed work methods or requirements, advanced chassis and body design, greater economy of operation of newer models, increased safe speeds desirable or necessary, traffic requirements, continued ability to maintain good appearance and, finally, and probably most important of all, availability of cash with which to make replacements.

●

Let It Settle Before Reclaiming

(*Continued from page* 22)

heat and then filtration, and which removes both liquid and solid impurities in one operation. We find the oil so treated to be the equal in every respect to new oil and we use it exclusively in all of our own equipment with excellent results. We have especially discovered that it changes far less rapidly when placed in use than does virgin oil, and have saved more than the purchase price of the reclaimer through the use of this oil in less than four months.

We shall be glad to contribute information to the FLEET OWNER at any time we feel that such information will be of any benefit to our fellow fleet operators and shall read closely any information of a like nature which other fleet owners may contribute to these pages.

(EDITOR'S NOTE: While on the subject, let's tell the experiences of another fleet operator on whom your Editor has recently called. This outfit stores its own crankcase drainings in drums, having built-in steam coils. By allowing the old oil to settle and then subjecting it to various heat treatments, much of the sediment passes down to the bottom and most of the dilution evaporates off. This method simplifies the work of the oil reclaimer and makes it perform more efficiently.)

●

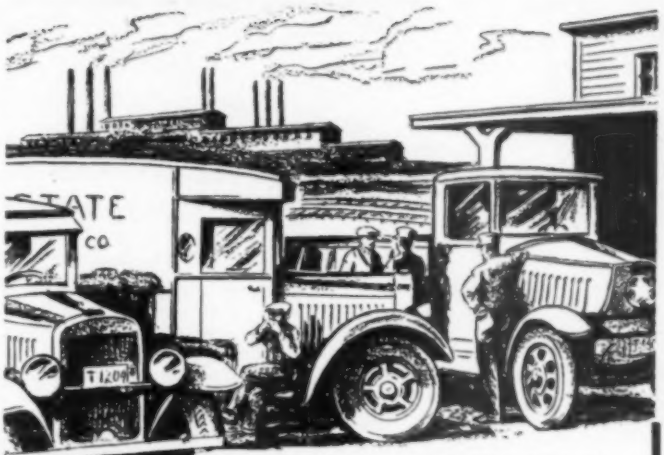
Valve Check-Up Cuts Fleet Costs

(*Continued from page* 24)

correct at all times, it is no indication that the valve head is seating properly. Therefore, it is a good policy to check the entire valve mechanism each time the cylinder head is removed.

Just as the public demands high speeds and quick acceleration, so fleet operators today demand trucks that travel, fully loaded, at speeds formerly considered fast for pleasure cars. To meet this demand, it has been necessary to develop new methods of manufacture. The result is that valves must be made of only the highest grades of steel. Constant research is carried on by steel companies, automobile manufacturers, and valve makers to increase the heat resisting qualities of valves by securing more efficient combinations of metallurgical elements. This constant testing has made valves capable of operating at the high temperatures demanded today; they must function satisfactorily when cold in zero weather to temperatures as high as 1700 degrees fahrenheit.

Even though valves have great physical stamina by reason of the high quality steel used in their manufacture, they cannot run satisfactorily unless checked



Trucks that "LEAK TIME".

Those New Taxes and License Fees Mean EVERY TRUCK MUST COUNT

Motor trucks always were expensive to operate. But *now* these trucks have an added expense; new and heavier taxes, and license fees that run up as high as $400.00 per truck! Where will it end?

Well, there is one thing you can do for yourself—and get quick results. You can make every truck count! How?

Prevent Wasteful Time "Leaks"

Put on *Servis Recorders* and get a complete record on a chart, in fact, a picture of just what each truck did—busy time and idle time—for the past 24 hours.

See the *Servis Recorder* chart shown below. Those wide heavy marks show just when your truck was working. In between are blank spaces that show when your truck was standing still—and how long.

This chart shows up all the delays. Here's a stop of 2 hours!

These delays STARE OUT at You

Delays, *avoidable delays*, are costly—from $3 to $5 an hour. When you can actually *see* these delays, you can stop them—easily. How? The coupon brings you the full story. Act today; that's none too soon. Over 100,000 trucks are now *Service Recorder* equipped.

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CLEVELAND, OHIO

THE SERVIS RECORDER
"Keeps Trucks Busy"

THE SERVICE RECORDER CO F.O.-1
Hanna Bldg., Cleveland, Ohio
Please send us, without obligation "10 Ways of Getting More Work out of Motor Trucks."
Company.....
Attention of.....
Street.....
City & State.....

The NEW
SPOKE
CELORON
TIMING
GEAR

IMMEDIATELY AVAILABLE

From
NAPA WAREHOUSES AND DISTRIBUTORS

SPONGEX
(Sponge Rubber)
Honeycomb Seat Cushions
Never "Bump"

Send for booklet "A New Way to Ride on Rubber." It tells why.

THE SPONGE RUBBER PRODUCTS CO.
Derby, Connecticut

A complete line of superior quality axle shafts for all makes and models of passenger cars, trucks and buses. A special engineering service to study your individual problems is available to all responsible fleet operators.

Write for complete information

The U.S. Axle Co. Inc., Pottstown, Pa. U.S.A.

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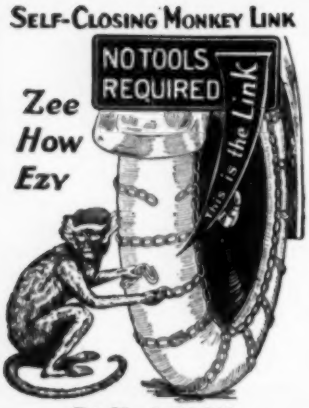

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Carry them on your trucks and busses. Your driver can make instant repairs—no delay. No tools required. Insures safe driving at all times. Fits all tire chains.

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ROCHESTER, N. Y.
At All Reputable Jobbers

and changed at frequent intervals. Care must be used in the installation, and the component parts of the assembly must be carefully checked to obtain the full benefits. It is essential to check the tappet clearance, springs for loss of life, guides for wear and out-of-roundness, spring retainer washers for wear, and seat inserts which may be loose. It is important to remember that for satisfactory results, the entire valve mechanism must be perfectly coordinated.

This necessitates periodic and thorough inspection. For example, if examination shows signs of pits or burning in the valve seats, it is a clear indication that valves are holding open a small amount due to improper clearance, sticky stem, or warpage of the head. Any indication of scale or uneven surfaces should be cause for installing a new valve. Since it requires a temperature of approximately 2,000 degrees to cause this condition, a large portion of the heat resisting qualities of the valve will be destroyed at this temperature. This means that the same valve, if reinstalled, will fall down in a short time for part of its stamina has been destroyed and burned away. This leaves a surface which is smooth and appears to be good, but in reality the resistance to normal operating temperatures has been lowered, and the seat and the stem directly under the head will soon burn.

Likewise, it is necessary to determine the amount of play in valve guides. Any indication of oversize or out-of-roundness at the top or bottom should be ample reason for a new valve guide. To hold compression, valves must operate in a straight line. With worn guides, valves open and close on an angle due to the tappet action. This causes the seat to close on one side of the port, but a small space of several thousandths of an inch on the opposite side of the head allows the exhaust gases to blow by, thus raising the temperature several hundred degrees. Under such conditions, it is only a matter of time until the valves are destroyed.

The growing use of premium and high-compression fuels brings up another problem, requiring more frequent examination and tappet adjustments to avoid serious burning.

To provide good seats, valve inserts are often installed and required for repair many times. Such inserts increase the valve temperature as much as 100 degrees, and hinder proper radiation from the seat to a certain extent. Hence, despite the high quality steel, satisfactory valve performance can be defeated by lack of proper installation and supervision.

Fleet operators can only secure satisfactory valve performance in one way—by periodic inspection. With such care, valves can be maintained in efficient condition just as spark plugs are. Likewise, costs are spread moderately over long periods, improving the operating statement.

●

Salesman Wanted (Advertisement)

SPECIALTY Salesman wanted on exclusive basis by leading manufacturer of automotive electrical products. The man we are looking for must have a wide acquaintance among fleet operators in the New York (Metropolitan) territory. Previous electrical experience not necessary. Another salesman of like qualifications is wanted by a paint manufacturer. Write to H. Clay Fischer, Editor, FLEET OWNER, 90 West Street, New York City for further particulars.

Servicing Cam-and-Lever Gears

(*Continued from page 26*)

drawing down the side cover plate should too many shims be removed. This is important and must always be done before assembling the side cover plate.

21. Remove these two cap screws keeping the side cover, gaskets and shims (7), against the screw heads so that the shims and gaskets will not drop off. Use a rag to catch the grease from the housing.

22. The shims come .003", .007" and .014" thick so that any desired adjustment is possible. The gaskets must not be used for making adjustments as their purpose is to prevent leakage of the lubricant. One gasket is used against the flange of the housing and the other against the cover, with the shims between the two.

23. Remove a .003" shim (7).

24. Reassemble side cover, shims and gaskets, using the two cap screws to draw the cover plate down tight against the housing.

25. Turn the steering wheel slowly from one extreme to the other, testing the end play in the lever shaft at various points as you go along.

26. Continue to remove shims until a slight drag is felt when testing the gear as in paragraph No. 25. Note that the gear must not bind any place and that only a slight drag should be felt. This should be located any place within ¼ of a wheel turn either way from the mid-position.

27. When the proper adjustment has been made, assemble the remaining cap screws (with a lock washer under the head of each screw) and test the gear before leaving this operation, as tightening the screws may change the adjustment slightly.

28. Important. Be sure that the minimum end play is .003" as this is necessary for lubrication. Unless a lubricating film separates the working parts at all times, excessive wear will occur. A closer adjustment will not correct any trouble and will shorten the life of the gear as well as impairing its operation.

29. Toward either end of the cam the end play will increase because the groove in the cam widens, thus permitting the stud to ride deeper in the groove. If the front end of the car is in proper condition this will not affect the steering. The increased end play is not objectionable in the extremes because the speed of the car must be decreased to negotiate sharp turns, and the greater play is not noticeable at lower speeds.

Connect Gear to Car

30. Make sure steering gear ball arm (2) is tight on the splined shaft and that the lock washer and nut are tight also.

31. Tighten adjusting plug clamp bolt or dash bracket clamp (par. No. 9), Turn wheel to see if the gear turns harder. If it does the steering column is out of alignment. In that case proceed as follows:

(a) Loosen dash bracket (and if necessary) frame bracket, and align gear. It may be necessary to shim the dash bracket. Do not spring the steering column to the bracket.

(b) See that frame bracket is tight to frame.

(c) See that gear is rigidly clamped in frame bracket so that it does not spring when the wheel is turned (when the drag link is connected and wheels are on the ground). Bracket must not be clamped so tight as to bind the gear, however.

(d) Test gear to make sure that tightening the brackets has not caused the gear to bind.

32. Turn the steering wheel as far to the right as possible, then rotate the wheel in the opposite direc-

Oil will cost 40% to 60% less in 1934

. . . if you put a SKINNER to work in your garage—for the Skinner Oil Reclaimer will restore to your crankcase drainings all the lubricating qualities they originally possessed, at only a few cents per gallon.

Get started right this New Year. Let a SKINNER save hundreds of dollars in your oil bills and at the same time reduce engine maintenance by making economically practical the use of those lubricants best fitted for your individual needs and stepping up drainage periods.

The coupon below will bring definite facts and dollar-and-cents figures of these savings.

• SKINNER •
OIL RECLAIMERS

SKINNER MOTORS, INC., Pioneers in Oil Reclamation
2229 Dalzelle Street, Detroit, Michigan

Please tell us definitely with facts and dollar-and-cents figures, what a Skinner Reclaimer will save us in cash and oil.

We purchase approx._____gals. of oil per month
We drain approx._____gals. of oil per month
We pay_____per gallon of oil
Our electric current rate is_____per kilowatt hour
Signed_____I-34

ARMORPLY
A SUPERIOR METAL FACED PLYWOOD PANEL FOR BODY CONSTRUCTION
Write for samples and prices
UNITED STATES PLYWOOD CO. INC.
603 W. 36th. ST. NEW YORK CITY

Remember this
Try out every single make of truck on the market and you will not find ONE that can equal the performance of a Marmon-Herrington All-Wheel-Drive. Write today and find out why.
MARMON-HERRINGTON
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21 Models 1 1/2 Tons Up New Low Prices

A CENTURY OF PROGRESS and the MORRISON HOTEL
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World's tallest hotel 46 stories high
Stay at the Morrison when you visit the Chicago World's Fair of 1933. The Morrison Hotel is an outstanding example of the progress of invention and industry displayed in A Century of Progress. Perfectly located in the "heart of the Loop," everything worth while is nearby —theaters, shops, railroad stations. All rooms are outside with bath, Servidor, bed-head reading lamp and circulating ice-water. Reasonable rates — Garage facilities — Special floor reserved for ladies.
A great hotel in a great city!
2500 ROOMS — $2.50 UP
LEONARD HICKS, Managing Director
MORRISON HOTEL
Madison and Clark Streets, CHICAGO

tion as far as possible and note the total number of turns. Turn the wheel back just one-half of this total movement, thus placing the cam lever in the mid-position. Place the front wheels in position for straight ahead driving. It should then be possible to connect the drag-link to the ball on the end of the steering gear arm without moving the gear to any appreciable extent (in most cars the steering arm will hang vertically). If this cannot be done remove the arm from the steering gear and place it on the splined shaft in the proper position. This is extremely important as any other position of the arm will change the effective ratio obtained from the gear. It is also important in order to obtain full throw of the front wheels equally to the left and to the right.

33. Refill the steering gear housing.

●

"Give Us a Better Universal Joint"

THIS seems to be the "universal" plea of thousands of fleet owners, truck drivers, contractors, haulers, bus owners and cross-country freighters, generally.

When the old-fashioned truck of ten or fifteen years ago moved around at a speed of ten to twenty miles per hour, on springs that were just about as flexible as the rear axle of a lumber wagon, the universal joint was not such a serious problem. There was no excessive rotary speed or vertical action of the spring weight to throw excessive action into the universal.

However, with improved roads and high-speed, high-powered engines, the demand on the universal joint is quite different, and judging from the complaints coming from owners of every class of motor vehicles, universal joint engineering will have to keep pace with changed road and speed conditions.

One of the most common complaints is that some joints will not retain grease, permitting dirt to get inside and causing excessive wear. It is quite obvious that a joint which might perform perfectly on a shaft turning at, say, 1,000 to 1,200 R.P.M. will act quite differently at 2,500 R.P.M. Higher powered engines put a greater strain on the drive shaft and faster road speeds produce greater vertical action to the springs, requiring greater angular distortion in the universal.

The rapid rotary action of the universal, of course, has a tendency to throw the grease out of the joint, especially in hot weather when the grease becomes fluid, and unless the joint is especially constructed to retain oil, which means practically air-tight, lubrication is rapidly reduced, permitting splashing mud and flying dust to enter, soon grinding out bushings and other bearing parts. Even though no dirt or dust ever works into the joint, without lubrication, it will soon burn out.

Another factor in universal troubles is the tendency towards overloading. The manufacturer may install standard equipment that is entirely adequate for the rated capacity in weight and speed, but he cannot foresee that the owner will use it as a trailer-tractor, that he will install high-speed rear axles, or that he will in some other manner throw a much greater strain on driving parts than they were originally designed to stand.

When any of these troubles come, is it wise to install the same kind of equipment that failed? It would seem the better course to diagnose the troubles, decide on the cause, and install a replacement unit that would cure the difficulty. If the old joint leaked, install one that will hold oil. If the old joint cracked under the strain of overloading or hauling a trailer, an oversize unit is indicated.

Facts and Figures

OFTEN we are asked for figures on the previous year's automotive production. The following has been issued by the National Automobile Chamber of Commerce. It represents the automotive industry's achievements in 1933. Keep it for future reference:

Production and Value

Cars and trucks produced in U. S. and Canada	2,048,000
Passenger cars	1,685,000
Motor trucks	363,000
Production, percentage increase over 1932	43%
Production of closed cars	1,535,000
Per cent closed cars	91%
Wholesale value of cars	$795,200,000
Wholesale value of trucks	$175,000,000
Wholesale value of cars and trucks combined	$970,200,000
Average factory price of cars	$630
Average factory price of trucks	$645
Tire shipments	43,000,000
Wholesale value of parts and accessories for replacements, and service equipment	$425,728,000
Wholesale value of rubber tires for replacement	$260,000,000
Motor vehicles, accessories, service equipment and replacement of parts and tires	$1,655,928,000
Gasoline consumption by motor vehicle, retail value including taxes	$2,227,000,000

Registration

Motor vehicles registered in U. S.	23,720,000
Motor cars	20,525,000
Motor trucks	3 195,000
World registration of motor vehicles	32,820,000
Per cent of world's automobiles in U. S.	72%
Passenger cars on farms	4,000,000
Motor trucks on farms	830,000
Motor vehicles on farms	4,830,000
Miles of surfaced highways	920,000
Total miles of highways in U. S.	3,040,000
Highway and street expenditures	$1,550,000,000

Taxes

Total motor vehicle user taxes	$1,170,000,000
Gasoline taxes, federal, state and municipal	$716,000,000
Percentage motor user taxes to all taxes from all sources federal, state and local	11%

Automobile's Relation to Other Business

Automotive industry is the largest purchaser of gasoline, rubber, alloy steel and malleable iron, mohair, upholstery leather, lubricating oil, plate glass, nickel and lead.	
Number of carloads of automotive freight shipped over railroads in 1933	2,621,000
Rubber used by automobile industry	80%
Plate glass used by automobile industry	38%
Steel and iron used by automobile industry	15%
Lead used by automobile industry	10%
Aluminum used by automobile industry	25%
Nickel used by automobile industry	28%
Gasoline consumption by motor industry	85%
Gasoline used by motor vehicles (bbls. of 42 gal.)	320,000,000
Lubricants used by motor vehicles (bbls. of 42 gal.)	9,500,000
Lubricants, percent used by motor vehicles	59%
Crude rubber used by motor industry, 1933 (lbs.)	716,800,000
Cotton fabric used in tires, 1933 (lbs.)	185,000,000

Motor Trucks

Motor trucks in use	3,195,000
Number of trucks owned by farmers (26% of all trucks)	830,000
Motor truck owners	2.500,000
Common carriers, percent of all trucks (Inter-state, 1.05% Intra-state, 4.45%)	5½%
Contract carriers, percent of all trucks	9%
Privately owned and operated trucks	86%
Total motor truck taxes	$295,000,000
Trucks represent 13% of all motor vehicles, and pay 25% of all motor taxes.	

Motor Buses

Motor buses owned	105,000
Number of buses in revenue service	45,000
Number of buses in local or transit service	17,500
Consolidated schools using motor transportation	21,500
Buses used by consolidated schools	60.000
Buses used by street railways	12,225
Street railways using motor buses	235
Steam railroads using motor buses	60

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THE REAL REPLACEMENT GASKET MATERIAL

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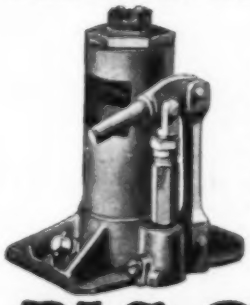

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A full line of hand jacks—1 to 75 tons—for road, shop, and industrial work. Also floor and curb models. Ask your Jobber Salesman. Write for literature.

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MAKE	MODEL	YEAR	KIND OF AXLE

NAME .....
ADDRESS ..... PLACE .....
Note: New Low Prices as of Nov. 1, 1933.

GUNITE FOUNDRIES CORP.
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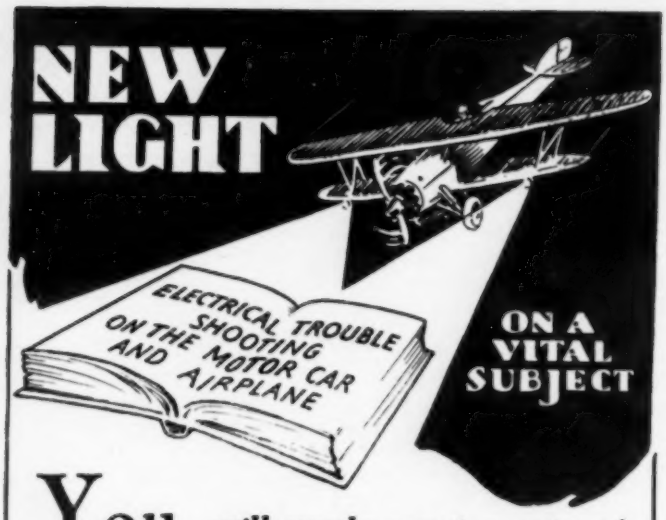

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Unusual "Desert Caravan Coach" Developed

AFTER creating widespread interest among engineers and transportation experts, the giant 36-passenger Marmon-Herrington Desert Caravan Coach shown here, has been shipped to the Near East where it will be placed in service across the Syrian desert between Damascus and Baghdad.

The coach unit, consisting of a Marmon-Herrington six-wheel-drive Hercules Diesel-powered truck-tractor and semi-trailer bus, was subjected to numerous tests for speed, riding ease, economy and all-around performance soon after its completion. Notwithstanding that the entire unit is practically as long as a Pullman car and weighs in excess of 20 tons, it was found to perform with flexibility and economy. Speeds ranging up to 60 miles per hour were attained in a test trip from Cleveland to Indianapolis while fuel consumption averaged more than 7 miles to the gallon of fuel oil with the bus partially filled with passengers.

Railroad and transportation officials who inspected the new bus were particularly impressed by the possibilities of similar equipment in this country. They took particular note of the performance and economy of the Diesel power plant, the speed, acceleration and all-wheel-drive traction features and the silence and comfort of the passenger compartment due to the semi-trailer type of construction. With the passengers isolated from the power and driving mechanism they were not disturbed by engine, transmission and other noises and vibrations.

The coach was built for the Nairn Transport Company, Ltd., operating passenger and freight service across the trackless wastes of the Syrian desert between the cities of Damascus and Baghdad and connecting such other points as Jebel Tenf, Rutbah Fort and Ramadi. The total one-way distance is approximately 700 miles and less than 24 hours will be required. Two round-trips will be made each week.

Before being shipped from the Marmon-Herrington factory in Indianapolis, the coach was displayed in Cleveland where the bus body was constructed by the Bender Body Company, and in downtown Indianapolis. Thousands of people took advantage of the opportunity to inspect the equipment in detail, the number of visitors being approximately 15,000 in the two cities. The coach was shipped from Indianapolis to New York on a special flat car ordinarily used to transport circus equipment.

The truck-tractor used in the coach is a regular Marmon-Herrington Model THD315-6 six-wheel-drive equipped with the newly announced Hercules heavy duty Diesel engine. Interesting merchanical features include both standard and auxiliary transmission with a total of 12 speeds forward and three reverse and Westinghouse air brakes. Tire size is 11.25 x 20.

Southern California is---
Headquarters for 6 Wheel Attachments

Invented Here!!

6 Wheel Attachments for four wheel trucks were originated in Los Angeles.

Basic Patents Here!!

Basic Patents covering probably only practical and economical design for 6 Wheel Attachments are held by the Utility Trailer Manufacturing Company.

Exclusive Advantages Are:

Weight on drive wheels increases when driving power is applied. Load distribution is not affected by brake application. No changes in the truck rear axle or spring assembly necessary for installation. No fish plating required since two points of frame suspension on each side prevent twisting "teeter totter" action and tipping down at rear. Two large universal joints between Attachment axle and rocker arms provide free independent vertical axle movement.

More Attachments Used Here!!

It is believed that more Heavy Duty 6 Wheel Attachments are in use in Southern California at the present than in all other States combined. The same proven design is available now for trucks of the Ford and Chevrolet class.

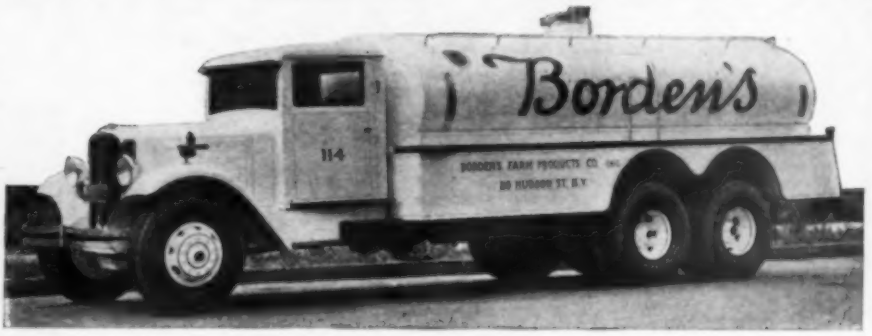

ILLUSTRATION OF RECENT UTILITY SIX WHEEL ATTACHMENT INSTALLATION FOR BORDEN FARM PRODUCTS COMPANY

UTILITY Distribution Nationwide!

The Utility Trailer Manufacturing Company market Attachments exclusively thru reputable dealers in all the chief trucking centers of the Nation, and maintain a warehouse stock in New York City for dealer convenience.

Truck operators everywhere testify to the efficiency of UTILITY 6 Wheel Attachments. Consult the dealer in your City or write direct to

UTILITY TRAILER MANUFACTURING CO.
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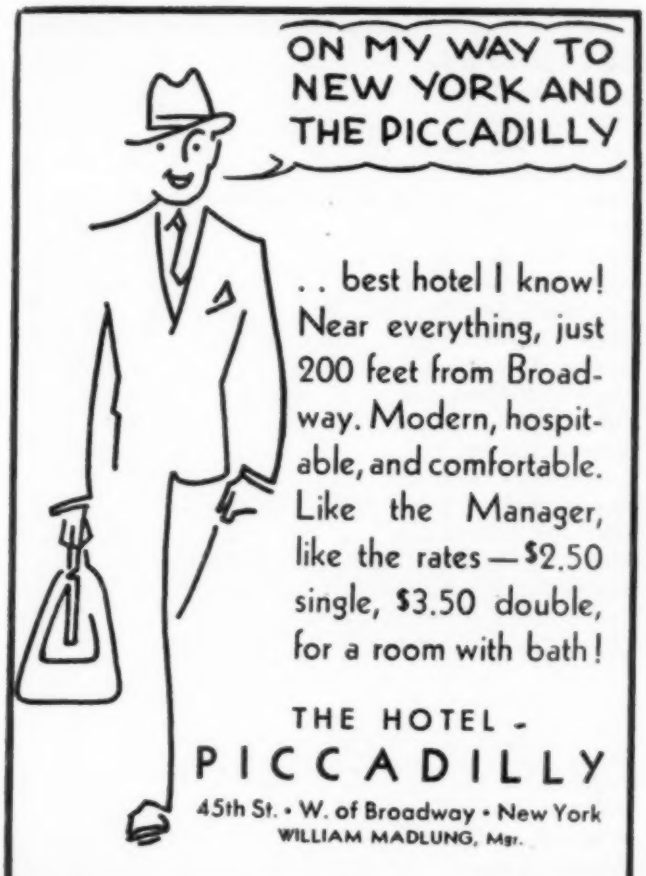
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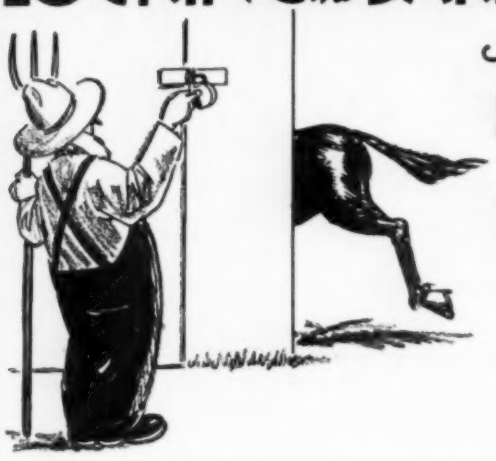

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Gives You
These Extra Features

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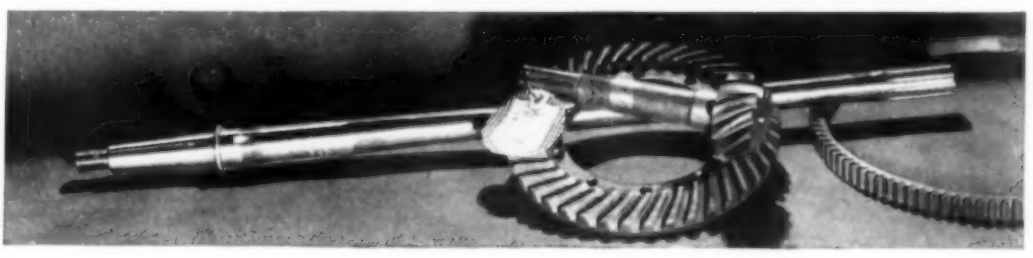

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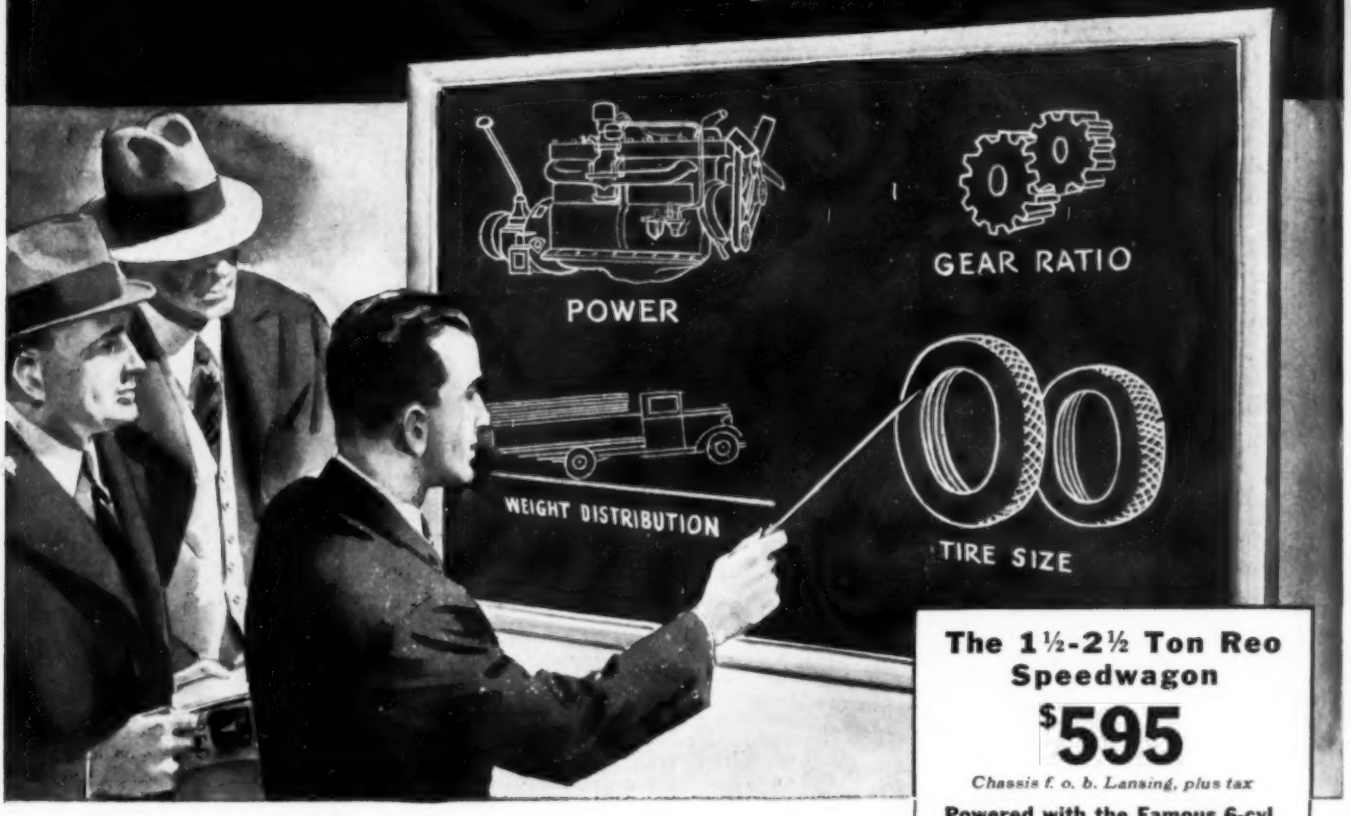

● It takes a good buyer to see all the pitfalls in truck selection.

Many a truck that seems right on the basis of claims may be entirely wrong on the basis of facts.

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Chassis f. o. b. Lansing, plus tax

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Check this great truck value against anything in the market. A real truck, with a real 6 cyl. truck engine and real truck parts throughout.

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